

FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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TO OUR READERS.

The Supply of "FLIGHT." Important Notice.

Order "FLIGHT" to be either delivered or reserved for you regularly.

As the demand for "FLIGHT" is so great each week, it is of the utmost importance that readers should place their orders *firmly* for copies of "FLIGHT" at the bookstalls, their newsagents, or direct from the publishers, at 44, St. Martin's Lane, W.C., if they wish to secure a copy every week and avoid disappointment. The stringent Government restrictions in regard to the supply of printing paper necessitates this precaution in order that only actual numbers required are printed, and all wastage by unsold copies may thereby be reduced to a minimum, if not eliminated.

THE PUBLISHERS.

EDITORIAL COMMENT.



WE congratulate the Royal Aero Club on at last having changed its quarters. Not only will the change be a welcome one to the present members, but it should have the effect of making the Club more popular on the social side of its activities, and thus

tend to bring into its orbit many of those who, although identified in some shape or form with aviation, have hitherto stood outside its membership. In the earlier days of the movement the old premises filled the bill admirably. There was very little of the social side to the movement, because that was restricted principally to those enthusiasts who were whole-heartedly devoted to its

The
Royal
Aero Club
in New
Quarters.

scientific development. Most of these, moreover, were men with other interests, and did not need to be provided for on the social side. Thus the old premises were quite adequate as a meeting-place for the exchange of views and opinions, and for the exercise of such of the social amenities as fell within the province of an organisation whose work was mainly that of a society of encouragement. All that was wanted then was something in the nature of a *point d'appui*, which the rooms at 166, Piccadilly, quite adequately provided.

So rapidly has the movement expanded, an inevitable consequence of the war, that the old order has completely changed, and with it, to a great extent, the functions of the Club itself in relation to the movement. While the Club still remains what it has always been—a "society of encouragement" and the controlling faculty of the sport—it has assumed a new importance, as we long since foretold it would, as the effective centre of the more active side of aviation. Many hundreds of new men have come into the movement during the past two years, and have introduced an altogether new community of interest to the whole. That interest requires centralising, and that can only be done through social intercourse. It is clearly the business of the Royal Aero Club to carry out the work of centralisation; and that it will be able to do very effectively now that it is installed in a building worthy of itself, and of the great movement of which it stands as the head and front in this country.

A Hun Discovery.

At last the German newspapers appear to have discovered that our French Allies and ourselves have produced an effective answer to the Zeppelin menace. It is possible that they have known it for some time, but that the operation of the Hunnish equivalent of the Defence of the Realm Act has prevented the airing of their knowledge until quite recently. However that may be, they are squealing like—well, like

pigs. What, they demand to know, do their own people mean by allowing the ever-to-be-strafted enemy to invent and actually to use such devilish devices for the destruction of those beautiful Zeppelins that have destroyed London so often? And, they also demand to know, are their military experts going to "wait until the enemy has devised some equally effective answer to the submarine"?

Really, the more we learn of the Hun the stronger becomes the conviction that he is utterly without the sense of humour. Not that there is much of the humorous in Zeppelin raids, or even in the destruction of enemy airships. There is too much of the tragic in both for there to be humour. But there is a good deal of humour in the spectacle of ponderous German newspapers girding at their own officials because the other side has found an answer to something they have invented or initiated. It is not even as though they looked the thing squarely in the face and said: "The other side has found the answer to this particular method of making war. Now let us sit down and find the answer to the answer." That does not seem to be the attitude at all. Rather they appear to administer castigation because the enemy was allowed to discover something that all the prescience in the world on the part of the Hun could not have prevented being discovered. They are as querulous as ill-tempered puppies about it, and do not seem to realise for a moment that they are making themselves supremely ridiculous.

There is this about it, however, that we know from experience that the German censorship allows nothing to be printed of which it does not approve. Neither does it permit much to see the light of day unless there is some object underlying its publication. Bearing this in mind, we may ask ourselves whether the criticisms of the Zeppelin policy are merely a device to throw dust in the eyes of the Allies. Is it part of a plan to lead us to believe that the Hun has definitely made up his mind that the Zeppelin game is not worth the candle and to cause us to become careless in our preparations for meeting the menace? It is certainly a possibility, and one which we doubt not those in charge of those preparations have already appreciated. We believe that unless our efforts are slackened off the Zeppelin danger is well in hand, though it would be foolish to asservate that no further attempts will be made to raid these shores by means of airships. There is the danger, which is a real one at that, but it is one to which our authorities are fully alive, and, we believe, are now fully prepared to meet.

The I.A.E. and Aviation Research.

We are extremely pleased to see that the Institution of Automobile Engineers continues to interest itself in the scientific side of aerial development. It announces that during its present session a paper is to be read on "Aeroplane Propellers," and this, we trust, will be followed by others of similar interest, if not during the current session, at some future period.

We are only on the threshold of development, and the more widespread the interest and the deeper the research, the more rapidly will events move in the future. There need be no question as to whether this or that scientific body is the right one to carry out the work of investigation, provided always that the subject is approached from the point

of view of real scientific inquiry. The greater the number of serious inquirers the more rapidly will the sum total of knowledge be increased. We therefore welcome the entry into the arena of aerial research of such a body as the Institution of Automobile Engineers. The experience of its members gained in the development of the internal combustion engine and in many other directions cannot fail to produce a most valuable reflex action upon all matters of research in which the Institution may in the future concern itself.

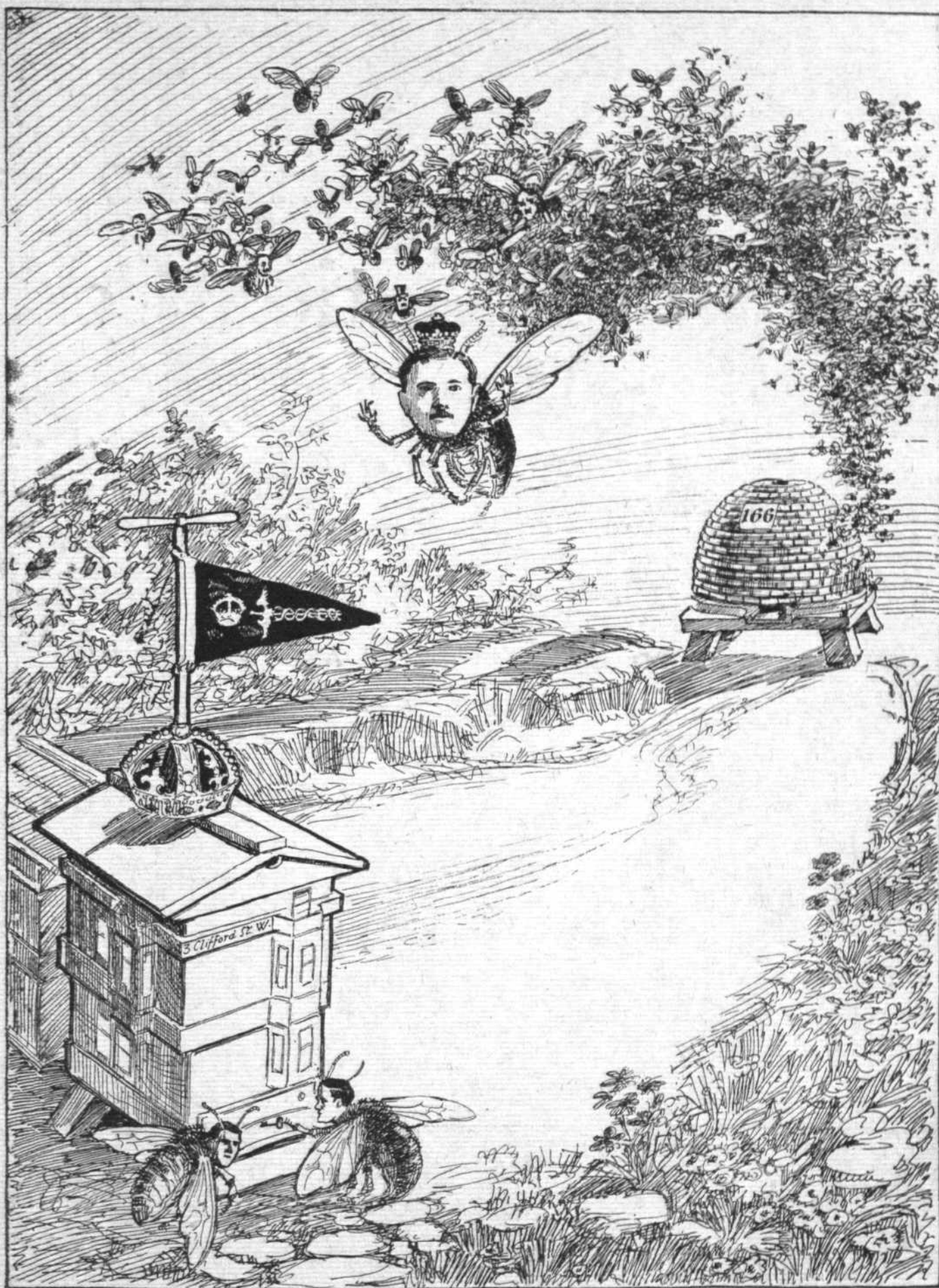
"Five Centuries of Aircraft."

There is no doubt that an impression exists among the mass of the general public, which is only indirectly interested in aviation, that the science of aerial navigation is something of very recent birth. It is a very natural impression, too, when the history of the past 10 years is viewed in perspective. A decade ago the man who had the temerity to discuss the question of human flight at all in a serious vein was voted a fit candidate for entrance to an asylum for the insane. The comparatively few who made a hobby of ballooning were regarded as being of the variety of the harmless lunatic, with more money than brains. Aeronautics was not, by reason of its very nature, a science that gripped the popular imagination. It was the pursuit of the very small minority, which in truth had so very little to show for its expenditure of money and of energy that it did not proclaim its doings from the housetops. Thus the discussion of matters aerial was left to the scientific societies, and the light of aviation was hidden under the bushel until the sudden developments of the early years of the present century brought flight into prominence.

It will possibly, therefore, come as something of a shock to the casual visitor to the Grosvenor Galleries, intent upon seeing the exhibition of pictures and models organised by the Countess of Drogheda, to realise that the record covered by the exhibits extends over more than five hundred years of aerial history.

Comprehensive though the array of exhibits is, and wide as is the period covered, even they cannot take us back to the time when the desire to emulate the birds first took shape in the minds of men. For that we should have to go back, in all probability, to the beginnings of the human race. But Lady Drogheda's exhibition does take us back in concrete form to a time long anterior to the first ascent by man into the upper air—a mere 232 years ago—and brings us down to the present time through all the crude devices and attempts to conquer the air until we reach the relative perfection of to-day as demonstrated in the Zeppelin and the Fokker. Let us interpolate that we do not regard the last as the summit of present-day perfection—we mention the name simply for the reason that the actual machine itself is present in the exhibition.

The exhibition is of the utmost historical interest, and is withal wonderfully complete as a record of aerial progress. It has far outrun the initial intention, which was based on something much more modest than the present achievement. Apart altogether from its surpassing interest, we would once more emphasise the fact that it has been conceived in a most worthy cause, the whole of the proceeds going to the Flying Services Fund and the Irish Hospitals Supply Depôts.



On the Wing—Changing the Hive.

"The New Club House of the Royal Aero Club at 3, Clifford Street, W., was opened to the members on Monday last."

THE BURGESS TYPE "U" SEAPLANE.

A TYPE "U" Burgess tractor seaplane was recently delivered to the Massachusetts Militia, and underwent exhaustive tests with the following results. The speed range, with and against the wind, over a carefully measured course averaged 40 to 67.9 m.p.h., and the climbing speed was 210 ft. per minute. The best gliding angle came out at 1 in 7.5. Other characteristics are given in the accompanying performance curves.

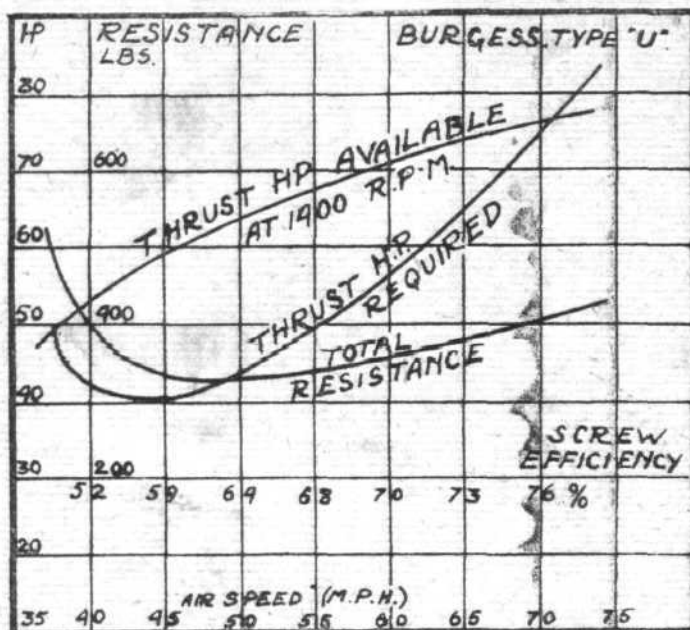
The upper plane is built up in three sections, the central section measuring 14 ft. 7 ins. and the outer 16 ft. 1 in., giving a total span of 46 ft. 9 ins. The lower plane, having a span of 38 ft. 3 ins., is in two sections, each attached direct to the fuselage. The chord of both planes is 6 ft. 3 ins., and the gap is 6 ft. Inverted V struts support the upper plane above the fuselage, on each side of which two pairs of struts separate upper and lower planes. From the outer interplane struts, a pair of diagonal struts support the extremities of the upper plane. Hinged to the rear spar of the upper plane are ailerons having an area of 45 sq. ft. each. The front spars are located 6 ins. from the leading edge, and the rear spars 1 ft. 9 ins. from the trailing edge. The total supporting area of the planes is about 500 sq. ft., and the total weight of the wings, with struts and wires, is 520 lbs. A factor of safety of six is employed in the construction of the planes.

The tail planes consist of a fixed triangular stabilising surface in two sections, attached to the fuselage 2 ins. below the top longerons, and two elevator flaps of 12 sq. ft. area each with a partially balanced rudder mounted between them. Forward of the rudder is a vertical triangular fin having an area of 10 sq. ft. The weights of the elevators and rudder are 20 lbs. and 15 lbs. respectively. Dual Dep. control is employed.

The fuselage is 24 ft. 8 ins. in length, 2 ft. 3 ins. wide from the nose to the commencement of the tail plane, where it tapers to a vertical knife edge. It will be noticed that the top longerons extend from

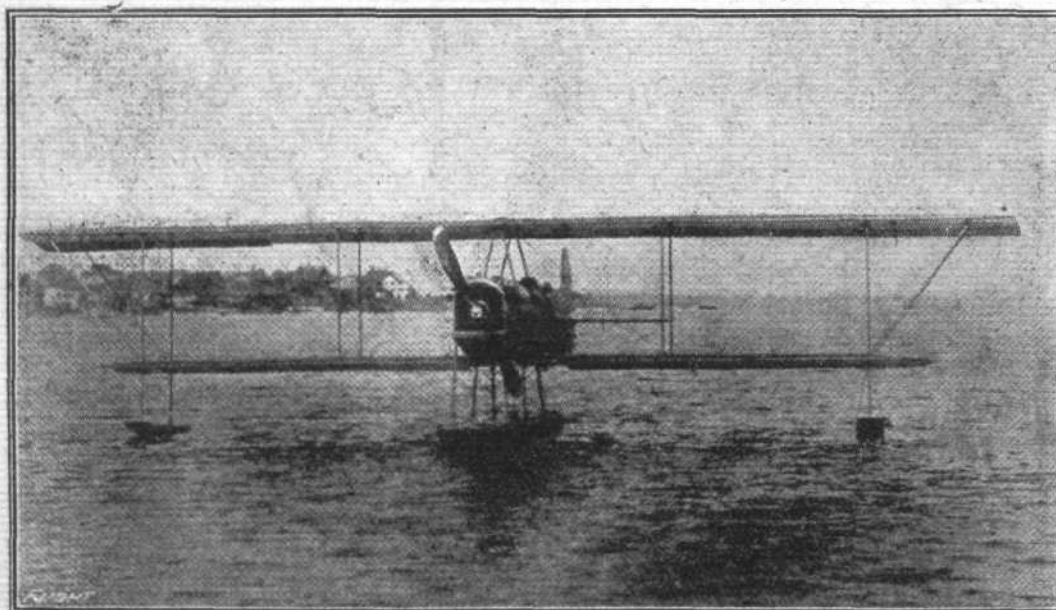
pit shields. The greatest depth occurs at the rear interplane struts, where it is 3 ft. 11 ins. The weight of the body is 200 lbs.

The floats consist of one long main pontoon and two wing-tip floats. The former is 19 ft. long, with a beam of 2 ft. 4½ ins. and a depth at the step of 1 ft. 10 ins. It is attached to the fuselage by three pairs of stream-line struts, the front pair, 3 ft. 5 ins.



Performance curves of the Burgess type "U" seaplane.

long, joining the fuselage at the nose, the centre and rear pairs, both 2 ft. 6 ins. long, joining at the front and rear spar attachments respectively. From nose of pontoon to the first pair of struts is 3 ft. 2 ins., between first and second pair 4 ft. 8 ins., between second and third 5 ft. 3 ins., leaving 5 ft. 11 ins. to stem. A 2-in. step occurs 10 ft. from the nose. The wing floats have a length of 6 ft. 6 ins., and are

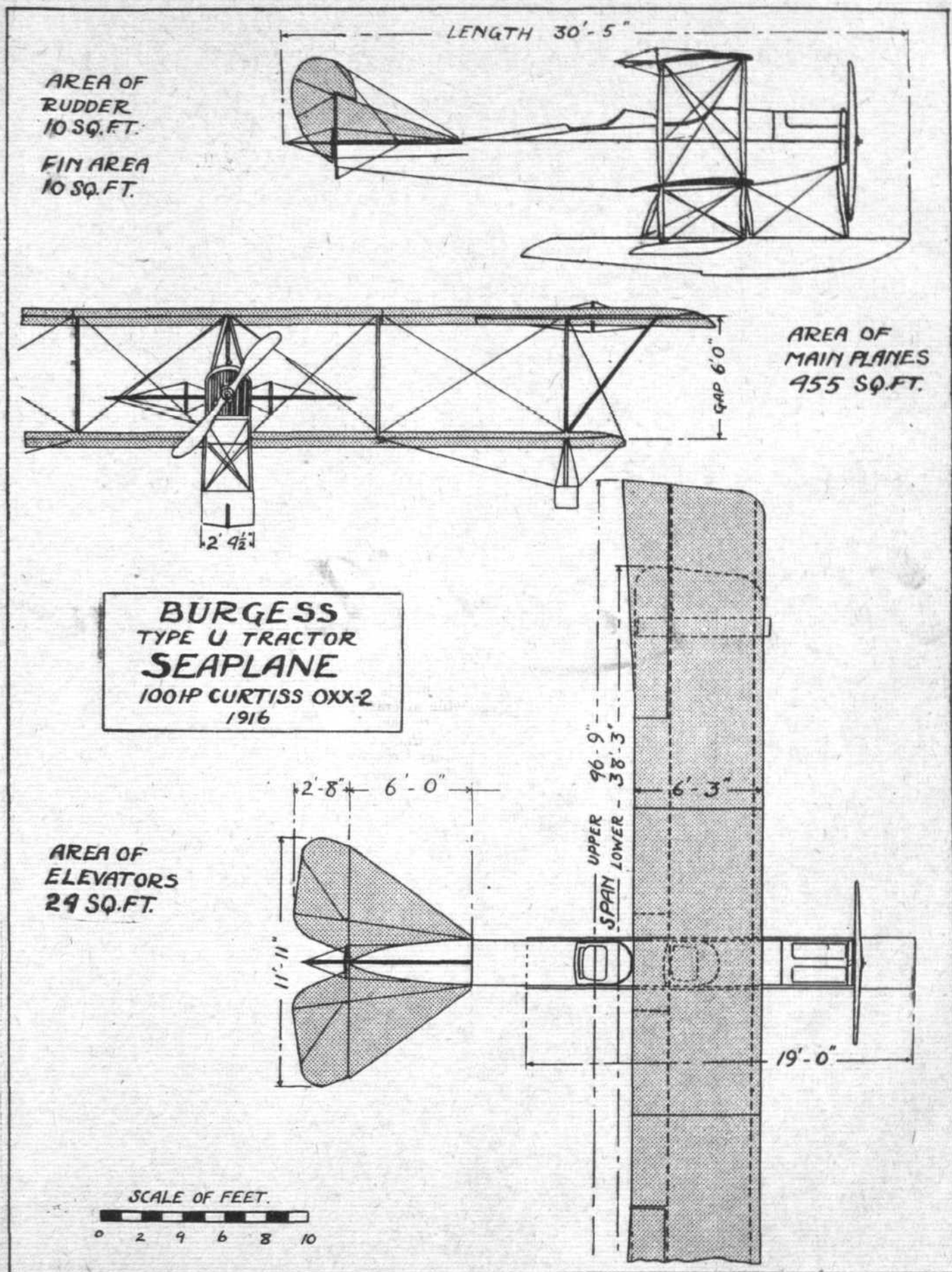


Front view of the Burgess type "U" seaplane.

Courtesy "Aerial Age."

end to end in a perfectly straight line level with the line of thrust, whilst the lower ones are given a stream-line curve. On top of the fuselage is a turtle-deck forming the cowling for the engine, and cock-

attached by struts, in continuation of the outer interplane struts, some 3 ft. below the planes. The main pontoon weighs 350 lbs., and the wing floats weigh 70 lbs.



THE BURGESS TYPE "U" SEAPLANE.—Plan, side and front elevations to scale.

The engine is a Curtiss OXX-2, 100 h.p., eight-cylinder, coupled direct to a Burgess tractor screw, 7 ft. 9 ins. diameter and 5 ft. 4 ins. pitch. It is mounted in a removable housing and is totally enclosed by the cowling. The radiator is mounted in the nose of the fuselage, and weighs 76 lbs.; 5½ gallons of water are carried.

The following are the main characteristics of the type "U" Burgess seaplane:—

Span, upper 46 ft. 9 ins., lower 38 ft. 3 ins.; chord, 6 ft. 3 ins.; gap, 6 ft.; overall length, 30 ft. 5 ins.; height, 11 ft. 2 ins.; weight, empty, 1,798 lbs.; useful load, 558 lbs.; speed range, 40-70 m.p.h.

HONOURS FOR THE R.F.C.

It was announced in a Supplement to the *London Gazette* issued on January 10th that His Majesty the King has been graciously pleased to approve of the appointments of the undermentioned officers to be Companions of the Distinguished Service Order in recognition of their gallantry and devotion to duty in the field:—

2nd Lt. NORMAN BREARLEY, M.C., L'pool R. and R.F.C.

For conspicuous gallantry in action. With another pilot he gallantly attacked seven hostile machines. Later, although severely wounded, he displayed great courage and determination in reaching our own lines.

Capt. GEORGE A. PARKER, M.C., North'n. R. and R.F.C.

For conspicuous gallantry in action. He attacked hostile aeroplanes on three occasions during the same flight, killing an enemy observer. On another occasion he drove off three enemy machines, pursuing one of them down to 750 ft. 3 miles behind the enemy's lines.

It was also announced that His Majesty the King has been graciously pleased to confer the Military Cross on the undermentioned officers and warrant officers in recognition of their gallantry and devotion to duty in the field:—

Temp. 2nd Lt. WILLIAM G. BARKER, Gen. List and R.F.C.

For conspicuous gallantry in action. He flew at a height of 500 ft. over the enemy's lines, and brought back most valuable information. On another occasion, after driving off two hostile machines, he carried out an excellent photographic reconnaissance.

Lt. (Temp. Capt.) JOHN A. G. DE COURCY, R.G.A. and R.F.C.

For conspicuous gallantry in action. He has located numerous hostile batteries, and by directing the fire of our howitzers has been instrumental in destroying a number of them. On one occasion he drove off three hostile machines.

Lt. (Temp. Capt.) CHARLES H. DIXON, York L.I., S.R., and R.F.C.

For conspicuous gallantry in action. He deliberately made himself a bait for a hostile machine, thereby enabling two of our machines to approach unseen and shoot down the enemy machine. He has carried out many bombing raids with great courage and success.

2nd Lt. HAMILTON E. HERVEY, Gen. List and R.F.C.

For conspicuous gallantry in action. He has done most efficient work in co-operation with our artillery, and has displayed great gallantry in numerous aerial combats.

Lt. FREDERICK G. H. MANVILLE, Can. Inf. and R.F.C.

For conspicuous gallantry in action. He has done exceptionally brilliant work, often under most difficult conditions. On one occasion he flew for three hours at a low altitude far over the lines, ranging on active enemy batteries.

Capt. GUY M. MOORE, R. Berks R. and R.F.C.

For conspicuous gallantry in action. He brought in much valuable information by flying at 500 ft. over the enemy's trenches. On another occasion he engaged enemy troops with his machine gun and scattered them.

Capt. GEORGE A. PARKER, D.S.O., North'n. R. and R.F.C.

For conspicuous gallantry in action. He attacked a hostile scout machine and forced it to land after a long combat. He displayed great courage and skill in outmanoeuvring this machine.

2nd Lt. (Temp. Capt.) WILLIAM C. PENDER, S.R. and R.F.C.

For conspicuous gallantry in action. On three occasions he flew over the enemy's trenches for long periods at a height of 500 ft., enabling his observer to gain valuable information.

Temp. Lt. (Temp. Capt.) CHARLES F. A. PORTAL, R.E., S.R. and R.F.C.

For conspicuous gallantry in action. He has done excellent artillery work in the air, often in bad weather, and at low altitudes; he has always set his flight the best of examples. On one occasion he shot down a hostile machine.

2nd Lt. HERBERT E. TANSLEY, K.R.R.C.

For conspicuous gallantry and enterprise during a bomb attack by aircraft on an important enemy railway bridge. A subsequent reconnaissance showed that the whole of the centre section of the bridge had collapsed into the river, thereby interrupting important enemy communications.

2nd Lt. (Temp. Lt.) WILLIAM H. A. WHITWORTH, Dorset R. and R.F.C.

For conspicuous gallantry in action. He has carried out a great deal of artillery observation in the face of severe attacks from hostile machines. On one occasion he fought two hostile aircraft for 10 minutes until another machine came to his rescue.

The undermentioned have been awarded a Bar to their Military Cross for subsequent acts of conspicuous gallantry:

2nd Lt. (Temp. Lt.) ALAN D. BELL-IRVING, M.C., Gord. Highrs., S.R. and R.F.C.

For conspicuous gallantry in action. He displayed great courage and skill when escorting a bombing raid. He engaged several enemy machines, and drove them off. Afterwards, although his own machine was damaged, he continued to fight against superior numbers of the enemy. (The Military Cross was awarded in the *London Gazette* dated October 20th, 1916.)

2nd Lt. HAMILTON E. HERVEY, M.C., Gen. List and R.F.C.

For conspicuous gallantry in action. He displayed great courage and skill on several occasions as machine gunner, and materially assisted in several successful flights. (The Military Cross is awarded in the *London Gazette* of this date.)



Flying Officer Rescued by Aeroplane.

THE following extract from reports received descriptive of the work of the Royal Flying Corps in the Eastern Mediterranean theatre of war was issued by the Air Board on Jan. 12th:—

"Two of our machines, which were sent on reconnaissance, found, on arrival at their destination, that two hostile machines were patrolling above the place. Photography was nevertheless proceeded with. An engagement followed, in which the hostile machines were driven off. In the course of it Captain M.'s machine was hit and he was forced to descend. He immediately burned his machine. The other machine (Captain F.) descended to the rescue. Captain M. climbed on the engine cowl and the two pilots escaped. When the machine left the ground a large number of the enemy were running to it, the nearest of them being within 200 yards."

Openings in the R.F.C.

THERE are still vacancies in the R.F.C. for certain classes of men such as armourers, acetylene welders, carpenters, coppermiths, motor transport drivers, electricians, engine fitters, watchmakers, and instrument repairers, mechanics having experience of wireless telegraphy, cabinet-makers as riggers, tailors as sailmakers, vulcanisers, and petrol winch drivers and fitters. The only restriction is that the men for these trades must be either in medical category B 1 or B 2. Men over 33 years of age can, even though unskilled, be accepted for the balloon party, B 1 or B 2, or for the labour section.

There are openings for cooks and storemen who are B 2, clerks and draughtsmen with engineering experience who are B 3, and tailors and shoemakers who are C 2 or C 3. Motor cyclists are accepted if in medical category A or B 1 if they have good eyesight.

THE PASSING OF THE THIRD FLOOR FRONT.

By a CLUB MEMBER.

THE opening of the new premises of the Royal Aero Club is an event of historic importance. Everyone connected with that distinguished institution will rejoice in the possession of a real clubhouse, with real club facilities. To be able to feed there, on the lines so humorously laid down for us by the authorities—soup and *hors d'œuvres* counting as half courses, sugar as a whole course if one gets any, and cheese not counting at all—will be a source of special comfort to those members who so often sat around in the one-and-only smoke-room, exchanging gossip, badinage and appetisers until it was too late to go out and get a meal at all.

But while our interest centres upon the new premises, may I be permitted to shed a silent tear on the passing of the old rooms at 166, Piccadilly, third floor front? The accommodation may have been far from ideal—some people even said so openly—but the situation was unequalled, and the old quarters will always remain pleasant memories for those who constituted the regular habitués. To be buried in the midst of a miscellaneous collection of offices was not a worthy fate for the pioneer club of aviation, however convenient it may have been for the tenants of some of those offices. The entrance was a monument of modesty, or insignificance, according to taste. The automatic elevator was often more depressing than elevating, not always being treated according to the rules laid down, or, rather, stuck up, by its constructors.

But what can replace in our affections that one jolly old smoke-room? What substitute is there for that unique view of Bond Street, Piccadilly, and all that in them is? Here was the very heart of the West End at a glance. On a fine morning, just before lunch, did we not neglect our work and forget our appointments through contemplating the endless

streams of traffic, discussing the latest thing in cars enjoying the occasional conflicts between motor 'bus and taxi, and admiring the very latest style of feminine headgear? And on wet days, when umbrellas glistened, and commissionaires with taxi-whistles endangered their front teeth, and the fairest of the fair daintily picked their way through the mud towards the nearest available shelter, did we not . . . ? But this is unfair, and I will pursue the question no further.

That room has been the scene of many happy little gatherings, and a few boisterous episodes. Is it not recorded that one somnolent member awoke to find himself and his armchair buried beneath a huge and complicated structure composed of practically all the rest of the club furniture? Have not the matchstands been used for purposes for which they were not originally intended? Have not passengers on passing vehicles been the astonished recipients of gifts of sugar?—(not lately, of course). And is there not a cheerful story of one member who, on a memorable occasion, suffered imprisonment for some hours in an adjoining apartment, and who was rescued with much difficulty after thrilling scenes?

(I must apologise before I go any further for asking so many questions. I really didn't intend to, and I've only just noticed it. Lack of literary style, that's all.)

The typical appearance of the room will not be forgotten. In one corner a slim, immaculately dressed youth has cornered all the latest magazines. At the table near the window someone in khaki—very tall when he stands up—is writing a letter. Near the fireplace a rotund and jocular personage is evincing a special interest in half-crowns. From the depths of an armchair comes a voice with an unforgettable



A SOUVENIR OF "166."—A view from the Royal Aero Club old premises in Piccadilly, looking up Bond Street.

accent, which seems to suggest Harry Lauder after a long tour in the U.S.A., and one fancies one hears the word "Tanks." A neat figure in a naval uniform enters the room and is greeted with, "Hullo, thirsty!" (it sounds like that, anyway). "How's Paris looking?" A tall, thin example of sartorial originality dashes in and takes all the limelight, so to speak. "Have you heard how I . . . ? Wait till the House re-assembles, my boy! . . . Absolutely priceless stunt! . . . Got 'em by the beard! . . . Some of these politicians ought to be shot! . . ."

And in the midst of it all Mrs. Barrett, always calm and collected, re-arranges the papers and magazines, executes orders for tea and other things, and carries out instructions regarding telephone messages as no

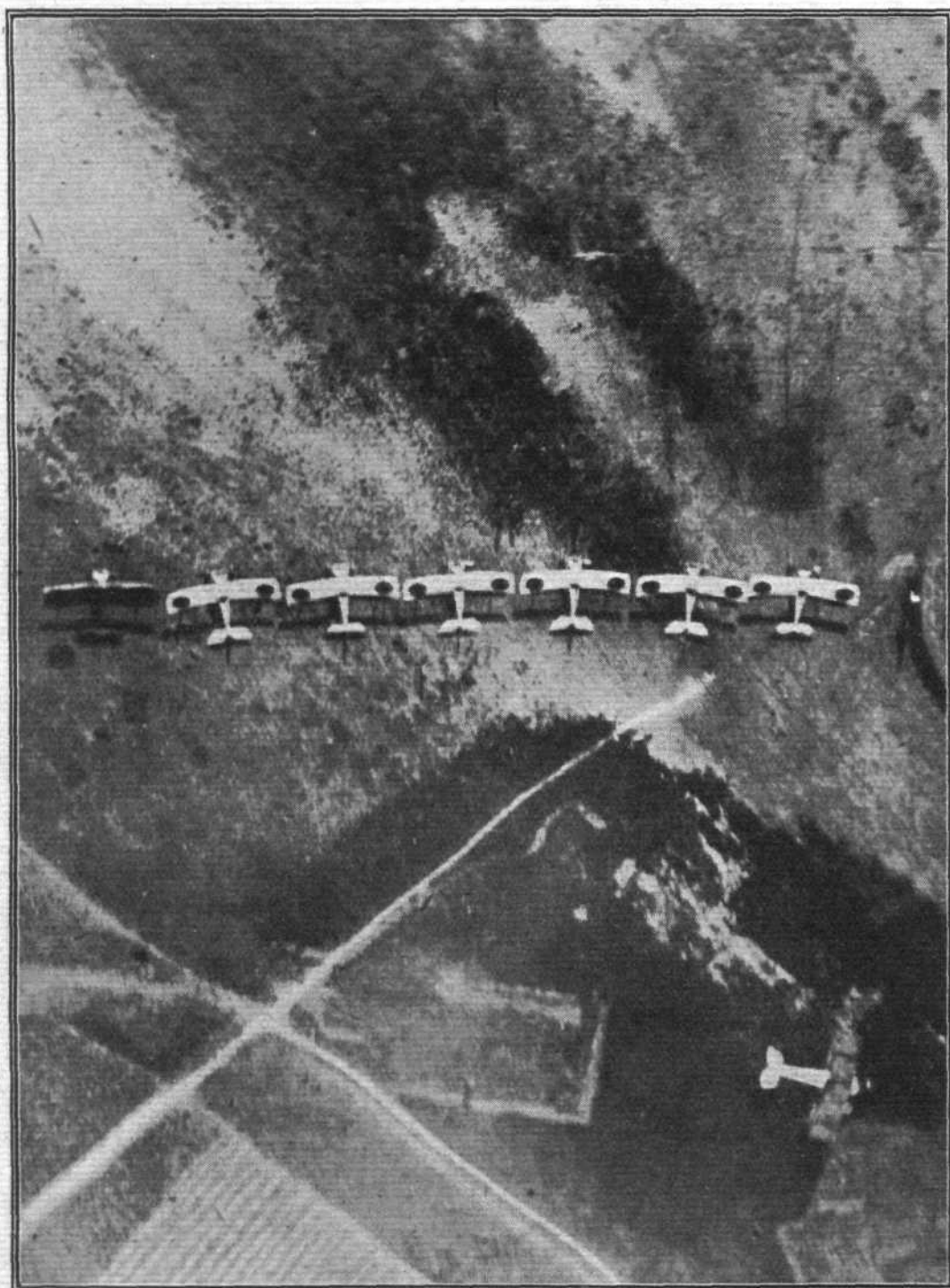
one else ever could or did. Wonderful woman, Mrs. Barrett! She is a whole club staff in herself. She once sewed a button on for me while toasting a muffin.

I know nothing of the new premises, except that I have seen the very dignified exterior. I hope sincerely that we may be able to live up to it. No doubt the accommodation will be excellent and the management above reproach. But I am glad of this opportunity afforded me to spil one little crystal tear, diluted as directed by the Liquor Control Board, over the passing of Number One Six Six. We shall all miss that view of Bond Street, and I, for one, should like a photograph of it as a sentimental souvenir.

It's an Ill Wind, &c.

THE Dutch Minister of War last week announced that he had purchased in addition to some U boats, several aero-

planes belonging to belligerent Powers, which had landed in Holland and been interned. Quite a nice, easy way, of acquiring *unter* and *uber see* fleets.



What a squadron (in this case a Belgian unit) ready for work looks like from above.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

New Club House.

The New Club House at 3, Clifford Street, W., is now open to Members.

Luncheon and Dinner are now served daily, and Bedrooms are available.

Suspension of Entrance Fees of New Service Members.

Until further notice, Service Members will be elected to the Royal Aero Club without Entrance Fee.

Subscriptions.

Members are reminded that the Subscription for the year 1917 became due on the 1st January last. Bankers' Order Forms can be obtained on application to the Secretary.

Servants' Christmas Fund.

The Subscription List for this Fund is now open.

THE FLYING SERVICES FUND administered by THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The Fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers, and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 3, Clifford Street, New Bond Street, London, W.

Subscriptions.

	£	s.	d.
Total subscriptions received to Jan. 10th, 1917	11,111	13	2
Employés of Ruston, Proctor and Co., Aircraft Works (Fifteenth contribution)	1	10	0

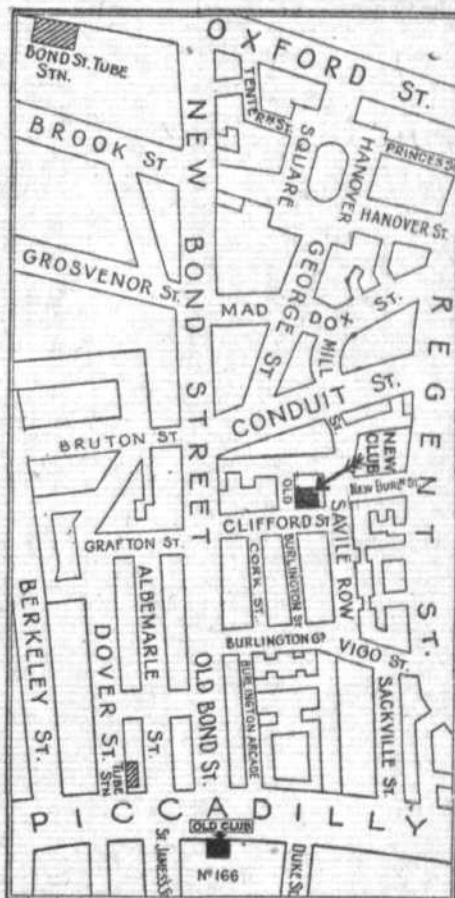
Total, January 16th, 1917 11,113 3 2

B. STEVENSON, Assistant Secretary.
3, Clifford Street, New Bond Street, W.



The Car.

No. 3, Clifford Street, New Bond Street, W. The new premises of the Royal Aero Club.



Plan showing position of New Club House, 3, Clifford Street, New Bond Street, W.

The Pan-American Aeronautic Exposition.

A CONSIDERABLE amount of interest appears to be centring on the Pan-American Aeronautic Exposition which the Aero Club of America are organising, and which is to be held at the Grand Central Palace, New York, from February 8th to 15th. Although no definite information is to hand as to what modern machines will be on view, the historical section will include the first Wright machine. An item in the decorations will be one of the latest model United States Army kite balloons, which is to be suspended in the centre of the hall.

A Rigid Dirigible for America.

FOR some time past the United States Navy Department has been working on the designs for a rigid airship of the Zeppelin type, and a message from Washington on January 10th stated that the order had been placed. The airship is to be armed with "large calibre rifles and howitzers." To assist the Navy Department United States naval attachés, says *Aviation*, have forwarded to Washington a great amount of information regarding Zeppelins which have been destroyed in England and Scandinavia, as well as a number of actual parts.

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THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The Fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers, and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 3, Clifford Street, New Bond Street, London, W.

Subscriptions.

	£	s.	d.
Total subscriptions received to Jan. 10th, 1917	11,111	13	2
Employés of Ruston, Proctor and Co., Aircraft Works (Fifteenth contribution)	1	10	0

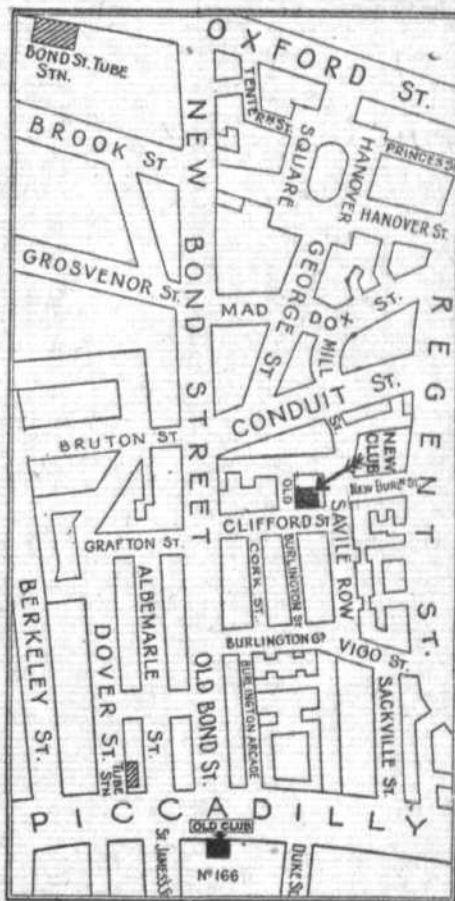
Total, January 16th, 1917 11,113 3 2

B. STEVENSON, Assistant Secretary.
3, Clifford Street, New Bond Street, W.



The Car.

No. 3, Clifford Street, New Bond Street, W. The new premises of the Royal Aero Club.



Plan showing position of New Club House, 3, Clifford Street, New Bond Street, W.

The Pan-American Aeronautic Exposition.

A CONSIDERABLE amount of interest appears to be centring on the Pan-American Aeronautic Exposition which the Aero Club of America are organising, and which is to be held at the Grand Central Palace, New York, from February 8th to 15th. Although no definite information is to hand as to what modern machines will be on view, the historical section will include the first Wright machine. An item in the decorations will be one of the latest model United States Army kite balloons, which is to be suspended in the centre of the hall.

A Rigid Dirigible for America.

FOR some time past the United States Navy Department has been working on the designs for a rigid airship of the Zeppelin type, and a message from Washington on January 10th stated that the order had been placed. The airship is to be armed with "large calibre rifles and howitzers." To assist the Navy Department United States naval attachés, says *Aviation*, have forwarded to Washington a great amount of information regarding Zeppelins which have been destroyed in England and Scandinavia, as well as a number of actual parts.

The propeller efficiency is deduced from experience, and a fair average to assume for approximate calculations is 75 per cent., expressed in the formula as 0.75.

Thus, if the brake horse-power is 100 and an efficiency of 0.75 is assumed, the thrust delivered at, for example, 100 ft. per second is:

$$T = \frac{550 \times 100 \times 0.75}{100} = 412.5 \text{ lbs.}$$

E. W. M. (Coulsdon).

We are afraid the defect in your eyesight would bar you from obtaining a commission as a pilot. You might write to the Director of Air Services, Admiralty, S.W., or to the Director-General of Military Aeronautics, Adastral House, E.C., stating qualifications and offering your services.

J. V. P. (Hastings).

For the R.N.A.S., obtain the necessary form from the Admiralty, and, having filled it up, send it to the Director of Air Services, Admiralty, S.W. For the R.F.C., apply to the Directorate of Military Aeronautics, Adastral House, E.C.

H. S. (King's Heath).

The book by Mr. F. W. Lanchester, "The Flying Machine from an Engineering Standpoint," just published by Messrs. Constable and Co., can be obtained from "FLIGHT" office, 44, St. Martin's Lane, for 4s. 11d. post free.

H. H. R. (Blackpool).

See answer to J. V. P. The pay of a Flying Officer is 12s. a day plus 8s. per day flying pay, the latter not being issuable while under instruction on probation. The full list of rates of pay is set out on page 984 of "FLIGHT" for November 9th. Your age would probably debar you from being accepted as a pilot.

L. H. (Bristol).

Write to the R.N.A.S. recruiting office, Brook Green, Hammersmith, London, S.W.

J. E. H. (Newcastle).

You should obtain the necessary form from the Admiralty, and, having filled it up, send it in to the Director of Air Services, Admiralty, S.W. If you decide to enter the R.N.A.S., you would find the little book, "Hints to Flight Sub-Lieutenants," very useful. It can be obtained from "FLIGHT" offices, 44, St. Martin's Lane, W.C., for 1s. 2d. post free.

W. G. W. (Barnet).

By fineness ratio of the hull of the airship is meant the ratio of the length to the diameter. The overhung gas and overhung buoyancy are, as you say, practically identical, and represent those portions of the envelope or hull not directly supporting any useful load.

A. C. G. (Freshfield).

It is impossible at the present time to publish the figures you ask for. The fastest officially recorded speed previous to the war was M. Prevost's 5 kiloms., at 203.850 kiloms. per hour.

W. P. W. (Dunstable).

You should write to the R.F.C. recruiting office, Polytechnic, Regent Street, W., and if they will accept you, apply to your commanding officer for permission to transfer.

J. F. (Wakefield).

We believe there are no vacancies at the present time. You might apply to the R.F.C. recruiting office, Polytechnic, Regent Street, London, W. If they cannot take you, why not try the R.N.A.S.?

R. A. T. (Letchworth).

We believe you can still enter the R.N.A.S. Apply to the R.N.A.S. recruiting station, Brook Green, Hammersmith, W.

A. S. C. (B.E.F.).

You must first find out if the unit you want to transfer to will accept you. Then apply to your commanding officer for permission to transfer. A pilot's certificate is not a necessary qualification for an air mechanic. If you were considered suitable, you might be put forward for a commission in the R.F.C., and would then be taught to fly.

M. T. (B.E.F.).

It is impossible to say definitely how long it would take to obtain the R.A.C. certificate, as a good deal depends on the weather. The pay of a R.F.C. Flying Officer is 12s. a day when training.

H. H. W. (Barrow).

Probably the examination for fellowship of the Aeronautical Society would meet the case. You can get particulars from their offices, 11, Adam Street, Adelphi, S.W.

L. H. (Witham).

It is difficult to say definitely what the machine was from your sketch, but presumably it was one of the F.E. type.



THE ROLL OF HONOUR.

REPORTED by the Admiralty:—

Killed.

Flight-Com. E. R. Moon, R.N.

Wounded.

Flight-Lt. E. R. Grange, R.N.

Flight Sub-Lt. A. H. S. Lawson, R.N.

Slightly Injured.

Flight Officer H. R. de Wilde, R.N.

Flight-Lt. W. T. S. Williams, R.N.

Accidentally Injured.

Prob. Flight Sub-Lt. L. J. N. Mackay, R.N.

Previously reported Missing, now reported a Prisoner of War.

Flight-Lt. E. J. Cooper, R.N.

Missing.

F. 8940 1st Grade Air-Mech. W. W. Higby, R.N.A.S.

F. 1866 Leadg. Mech. D. Kennedy, R.N.A.S.

F. 9197 Leadg. Mech. F. A. Wright, R.N.A.S.

Reported by the War Office:—

Killed.

2nd Lt. H. Jameson, R.F.C.

2nd Lt. L. C. F. Lukis, Essex R., attd. R.F.C.

Lt. W. D. Thomson, Can. Inf., attd. R.F.C.

31017 Air-Mech. C. W. Newton, R.F.C.

Previously reported Missing, now reported Killed.

2nd Lt. M. Hayne, Lancs. Fus., attd. R.F.C.

Capt. Rt. Hon. A. T. Lord Lucas, Yeomanry and R.F.C.

2nd Lt. F. G. Therry, R.F.C.

Capt. D. M. V. Veitch, Ind. Cav., attd. R.F.C.

Died of Wounds.

2nd Lt. E. G. W. Bisset, Gordon Hdrs. and R.F.C.

Previously reported Missing, now reported Died of Wounds as a Prisoner of War in German hands.

Capt. A. J. M. Pemberton, M.C., Leinster, attd. R.F.C.

Wounded.

Lt. D. M. Faure, R.F.C.

Lt. W. F. T. James, Yeomanry and R.F.C.

Lt. C. A. W. Thompson, R.F.A., attd. R.F.C.

856 Flight-Sergt. G. W. Halstead, R.F.C.

Previously reported Missing, now reported Wounded and Prisoner of War in German hands.

Capt. A. C. Bolton, R. Scots Fus., attd. R.F.C.

Missing.

2nd Lt. F. A. Mann, Suffolk and R.F.C.

Maj. L. Parker, Hussars and R.F.C.

2nd Lt. E. G. S. Wagner, R. Warwick and R.F.C.

Previously reported Missing, now reported Prisoners of War in German hands.

2nd Lt. W. Black, Durham L.I. and R.C.F.

2nd Lt. B. W. Blayney, R.F.C.

3467 1st Air-Mech. H. A. Harding, R.F.C.

Missing, believed Prisoner of War.

2nd Lieut. A. D. Pocock, R.F.C.

"Getting Her Height."

So many requests have been received for copies of the splendid double-page picture, "Getting Her Height," by

Capt. Roderic Hill, M.C., which appeared in "FLIGHT" of January 4th, that it has been reprinted on art paper. A limited number can be obtained from "FLIGHT" offices, 44, St. Martin's Lane, W.C., price 1s. 6d. post free.

ARMCHAIR REFLECTIONS.

by the "Dreamer"

ADORNING these shoulders of mine is a head that is fairly good as heads go, and has stood me in good stead these many years past, though it has never been clever enough to lead my feet into the paths that are easy. Yet I am

MY THIRD HEAD



on the look-out for another head. Make no mistake, I am not thinking of undergoing a surgical operation, but merely keeping my eye open as I pass the curio shops in Wardour Street. The kind of head I want is one that I can talk to, and one that will talk back. My own legitimate head, when it considered this frail body of mine sufficiently matured and strengthened—or it may have been the strengthened body overruling for the moment a generally discerning head—led me into those pre-

cincts whereby I became possessed of another head, and one that can talk back, but that is not precisely my meaning or necessity. I want a head that can talk some horse-sense into me when my own is stuffed up and clouded like unto a Newfoundland fog-bank in November—when it feels, as it feels now, like a chunk of sponge-rubber saturated with unbaked Yorkshire pudding, owing to dose upon dose of influenza.

You will have guessed that I have been reading Eden Phillpotts again. Alas! I do not possess a "Laughing Philosopher" who will talk to me at midnight and provide me with the much-sought "copy" which I

THE HEN OR THE EGG



am unable at these times to evolve myself. Heads I have in my writing-room that treat all my attempts at conviviality with contempt. William of Avon on his bracket in the corner will not condescend to so much as raise the lids from his eyes. All the tobacco smoke I have ever

directed at him in an attempt to ring his poetic nose has only resulted in changing the white of his plaster to a lemon yellow. I think William has the jaundice. Possibly my cast of the Bard of Avon has never become imbued with the magic of "My Laughing Philosopher"; possibly the original has not been sufficiently long dead. You will remember that the head possessed by Mr. Phillpotts only spoke for 50 days, once every 500 years. I am afraid I cannot wait for William.

Fact of the matter is that when I get these rapidly recurring and multiplying doses of "flue," my usual dovelike and gentle nature undergoes a remarkable change. In place of the rippling cadence of soothing words with which I habitually spread sunshine around, come others. I am made aware of this change in myself. I am given to understand by my other head that I am an argumentative person, in language less polite than that which I have attributed to her.

"Billikin," the "God of Things as they Ought To Be," can't raise enough in the way of ideas to cause a "comp." to wet the thumb and first finger of his right hand. I have talked to that "Billikin" at night-time until the household above must have thought by my persuasive language that I was entreating the cook not to leave us, but all to no purpose. Once, in a desperate attempt to break through his reserve, I stuck the end of a half-smoked cigarette in his mouth, but he looked so much like a popular advertisement that when a ring came at the front door late at night I hastily removed the evidences of my levity for fear it was our advertisement manager come for a chat and a cigar.

Our manager has his own views about free advertising. Most managers have. Also, and by the way, they have their own views as to whether the Editorial provides the means whereby they are enabled to gain their livelihood, or whether it is the space they graciously refrain from letting that provides the Editorial with somewhere in which to let off steam. There is always that about advertisement

A PATENT INCUBATOR



managers that leads one to suppose that they believe the egg came before the hen, otherwise how could the hen ever hatch out? It is futile to argue with these "space merchants" as to the why and the wherefore. They are not logical. They talk in a strange tongue and with a crabbed vocabulary. Their lingo is composed principally of "quarters, halves and fulls," punctuated by "discounts for fifty-twos, facing matter, back covers and Christmas numbers."

Should one try to knock common sense into them with reference to the egg and the hen, what happens? Before you know where you are they whip out a blue form and you have signed for 26 quarters on alternate weeks to advertise a patent incubator which you never possessed. Advertisement managers are so persuasive.

Last week I met a man who said he could see no future for aviation. I tried to persuade him into a different understanding, but I lack the persuasive faculty. If I were being initiated to-night into the mysteries of the Royal and Ancient Order of Corks, I would, just previous to the removal of the bandage from my eyes, when the Chief Bung asked me what I

should most like to see, answer, "The man I saw last week."

On the face of it this looks like an admission of the imputation directed at me by my other head as set forth above, but it is not so. It is simply that I require a head to pun—to talk to, and that man's head is the one most suited to the purposes of my present mood. Presently, when I am put upon half-rations of ammoniated quinine and pocket handkerchiefs, I shall realise that that man's head would not have been of the slightest use to me with a view to extracting "copy," but resulted only in my having had to pay a tax on amusement.

I have thought sometimes that I should like my third head to be the head of an aviator, with leather helmet and goggles all complete. But this would essentially be the head of a modern, and what can a modern head know of all those wonderful things in which aviation will play such a conspicuous part in the future?



AIRISMS FROM THE FOUR WINDS

SUGGESTIONS of the London "Safety First" Council—of which, by-the-by, Lord Sydenham was elected Chairman on Monday—include a white armlet for night use to lighten the Zepp. lighting regulations. Coloured lighting schemes for street refuges, &c., is another brainwave, so that in time we may hope to see London at night-time remindful of a never-ending Christmas tree.

A BRACE of High Flyers in embryo are announced by the *Lokalanzeiger* in the persons of Prince Friedrich Sigismund, the eldest, and Prince Friedrich Karl, the second son of Prince Friedrich Leopold of Prussia, both of whom have entered the German Flying Corps.

"THE Teaching of Flying" is the title of a lecture to be delivered to members of the Aeronautical Society of Great Britain by General Brancker on January 24th, starting at 8 o'clock, at the Institution of Civil Engineers, Great George Street, Westminster.

ANOTHER point to be noted is that the Institution of Automobile Engineers intend to deal with the subject of "Aeroplane Propellers" at one of their remaining four meetings of the 1917 session.

There are folk who argue that there is nothing commercial in the aeroplane. Yet only last week a telegram sent off from the *Daily Chronicle* London office to a resident at Witham, Essex, on January 22nd, 1906, at—to be exact—2.7 p.m., was delivered on January 7th, 1917, a matter of 11 years, there or thereabouts. Surely the job could have been done quicker by, say, a Sopwith scout.

A REMINDER of the unquenchable flow of humanity which has been so apparent in every action of the Huns since they let loose the dogs of war in 1914, is forthcoming in Admiral Sir David Beatty's affidavit in the Prize Court on Monday last, in connection with the Dogger Bank battle on January 24th, 1915, and the sinking of the "Blücher." In his affidavit, Sir David again confirmed the original report of Capt. Brock of away back in March of 1915, that, in accordance with British and civilised war customs, every attempt was made to rescue the crew of the doomed German battleship from drowning, "in spite of the difficulty experienced through enemy aircraft attacking the rescuing ships." Here is another chance for the Hun Kaiser to claim that in these operations no doubt his soft-hearted aircraft crews deemed they were helping by thus strenuously dropping bombs from Zeppelins and seaplanes amongst their drowning compatriots and the rescue party.

"My Laughing Philosopher" could tell of the things that had happened in the past centuries, but not one word of the future. I want a head that shall tell me of that which is to be, and that which will be when I am no more. I want to know about the time when the petrol internal combustion engine, as we know it to-day, will be found only in the British Museum. When steam, or perhaps some power of which we know nothing at the present moment, will propel giant aeroplanes and airships across the seven seas and the five continents at hundreds of miles an hour.

I greatly fear I shall not find that third head of mine in time to be of any use to me, but here I will bequeath my services to a future generation. If, in a thousand years to come, any person passing along Wardour Street should see exhibited for sale a head that looks a bit dreamy, I counsel them to become the proprietor thereof; I will tell them of the man who could see no future for aviation.

MORE Smiles at Hendon. There was much rejoicing on Tuesday night of last week amongst all "Urbanites" who matter in that district, when Geoffrey Michael Smiles, of Golders Green and Hendon Aviation fame, was publicly presented by the Chairman of the Urban District Council with the certificate of the Royal Humane Society for having gallantly attempted, at great personal risk, to save a boy from drowning in the Silk Stream. "FLIGHT" readers will remember that Mr. Smiles dived into the water half-a-dozen times before recovering the body. Mr. Sturgess (the Chairman) said the spot was a most dangerous one, and Mr. Smiles ran grave risk of losing his own life.

ONCE again, due to the number of exhibits, the opening date of the exhibition of "Five Centuries of Aircraft" at the Grosvenor Gallery has had to be put off a little while. In the meantime a few more details as to the promised show are available.

In this historical exhibition, showing the complete story of aeronautics from the beginning to the present day, the Countess of Drogheda has managed to collate a hugely interesting collection of pictures, photographs, models, component parts and complete aeroplanes from the earliest to the latest times. Included on the modern side, the exhibits are an array of Zeppelin relics loaned by the Royal Flying Corps and the Royal Naval Air Service, such as a machine rifle from the Cuffley airship, and other machine guns, several petrol tanks, a complete gondola and the intact stern of a Zeppelin.

Pictorially the exhibition will be particularly attractive. Hundreds of old prints show the earliest attempts at flight, and the gradual evolution of the idea that led to the ultimate conquest of the air is traced; whilst a complete Fokker of the latest type, brought down by one of our own airmen, will lend an air of actuality to the exhibition.

There is an official photograph of the first British-built "Zeppelin" in the air, and official photographs loaned by the War Office and the Admiralty recording last year's brilliant performances in the air, none of which have been allowed to appear in print; and these are supplemented by a number of official photographs of the battlefields on all fronts, taken from the air, also unpublished.

The French Aero Club and the Aeronautical Society contribute objects of the highest value and interest; and Rae-macker, Gordon Crosbie, John Lavery, Norman Wilkinson, Joseph Pennell, Herbert Finn and others will be represented by typical examples of their art, all dealing with some episode connected with flight, in addition to original drawings lent by "FLIGHT" and other periodicals.

The Countess of Drogheda has been supported and assisted

throughout in her labours to make the exhibition a big success by Brigadier-General Brancker, Director of Air Organisation, and by Commodore Murray Sueter, of the Air Department of the Admiralty.

The opening date will be announced shortly, and once again it should be noted that the proceeds of the exhibition are to be devoted entirely to the benefit of the Flying Services and the Irish Hospitals Supply Depôts, working for and under the British Red Cross Society.

"FLY Expert, Tigris Corps." "Waging War on the Soldier's Pest." "Mr. Candler in a new Role." "The Mesopotamian Fly."

WHEN all the above headings and sub-headings caught our eye in the *Times* last week, all sorts of visions and doubts instantly sprang into relief in our mind. Edmund Candler, the great war correspondent, had turned "airman" with a vengeance, was the first thought. Or was it he had suddenly developed into an anti-aircraft enthusiast? Either way, the result should be instructive, emanating from so observant a writer as the *Times* Correspondent. But our emotions after all were wasted, as the first paragraph revealed the fact that Mr. Candler had been appointed to investigate the claims put forward for thoroughly strafing the winged fly of the Tigris district, to the benefit of our fighting forces contained there. The last atom of romance disappeared when this "Fly Expert" mused upon his appointment thusly: "It is a noble aim, and people who realise this inherent nobility raise me to the dignity of 'O.C. Flies.' To the ribald I am merely the Bug Strafer."

IN the opinion of Sir John Knill, sitting at the Mansion House, in cases where the business premises of large firms are illuminated so as to contravene the lighting regulations of the Metropolis, it is the occupiers or owners who should be summoned and admonished in person, not housekeepers, office cleaners and such like lesser lights. Which seems common sense up to a point. But why not have both up to explain who's who and settle the question in Court? It's a remedy worth a trial, anyhow.

COLCHESTER MUSEUM is the latest institution to receive from the W.O. a Zeppelin relic in the form of a machine gun, besides portions of the girder-work and wreckage of "L 33." Makes one wonder whether one of these mammoths may have come to rest somewhere in the neighbourhood of that city.

THE following *résumé* from the *Survey Herald* of the 5th inst. of a visit to Staines has been sent us by a "Nine Years' Reader." We wonder why? (N.B.—There is no prize for supplying the answer.): "About noon on Wednesday a 110 h.p. Sopwith biplane came safely to earth in a field between the river and the Staines and Chertsey Lane, rather nearer the Staines end of the thoroughfare than the Chertsey part of it. The pilot had flown from Northolt, near Harrow, to visit a friend in Prince Rangi's hospital. He was met by Dr. Batchelor and proceeded in that gentleman's car to thy institution. After lunch the airman returned to the field, entered his self-lifting machine and flew home. Two lads and a young man were on guard when one of our representatives was able to make an inspection of the machine. The Rev. A. C. Tranter, accompanied by his little son Paul and a little girl, were also interested spectators of the marvellous

little airship, the engine of which was small but most elaborately constructed. Verily we shall soon be setting our affections on things above, and at this rate it looks as though the light self-lifting biplane will become a popular mode of travelling after the war. Evidently Cruikshank, the famous caricaturist, proved himself a bit of a profit (*sic*) when in the fifties his jocular pictures forecasted universal travelling by flying machines."

"THE Super-Huns," by Paul Louis Hervier, translated and published by Eveleigh Nash, gives a gaunt silhouette, amongst other notable Huns, in Count Zeppelin. Whilst according the Count a large mead of praise for much of his career, M. Hervier is very caustic upon the development through the war of Zeppelin's character. He regrets that a man who started life as an honourable soldier should have passed into the category of a criminal when such opposite opportunities were offered him of utilising his invention more in accord with the benefits which humanity naturally looked to derive from the navigation of the third element. It's a bit rough though that the source of the Count's inspiration—America—should come in for some of the ignominy which now attaches to the name of Count von Zeppelin. But there are many stories and light touches to relieve the otherwise sombre side of the sketches.

DEAR OLD LADY: "I suppose you'll follow in your father's footsteps when you grow up?"

THE BOY: "I can't; he's an airman."—*London Opinion*.

TEN YEARS AGO.

Excerpts from the "Auto." ("FLIGHT's" precursor and sister Journal) of January, 1907. "FLIGHT" was founded in 1908.

THE DE LA VAULX AIRSHIP.

THE latest trials of the De La Vaulx airship give the greatest satisfaction to the Count. On the 9th inst. he made two ascents at Sartrouville, going out at a quarter past two, and executing a variety of manoeuvres at an average height of 200 metres for a quarter of an hour. At 3.39 p.m. the airship went out again, attaining about the same height, and manoeuvring with great reliability. There was a very considerable wind during the experiments, and the fact that the airship proved to be thoroughly controllable in spite of it, with the relatively small-powered motor—a 16 h.p. Ader—which provides the driving power, is the best possible testimonial to the efficiency of the lines on which she is built.

M. SANTOS DUMONT'S PROCEEDINGS.

M. Santos Dumont's new aeroplane is advancing rapidly. As compared with its predecessor, there are several new and important alterations in structure. The total lifting surface will be only 13 square metres which, it is calculated, will have sufficient lifting power at the increased speed that the new 100 h.p. Antoinette motor should provide. The surfaces, instead of being varnished canvas, are to be of wood, and one of the wings is already finished. M. Santos Dumont anticipates attaining a speed of at least 40 kilometres per hour, and hopes to get off the ground after a run of 14 metres, which with the new machine is to be accomplished on a single wheel instead of on two, as in the case of the former "Bird of Prey."

CORRESPONDENCE.

The Aerial League.

[1932] Allow me to direct your attention to the reflection which, no doubt inadvertently, you cast upon the Aerial League in your publication of the 4th inst.; for in your issue of April 6th, 1916, on page 299, reference is made to a development of the League in conjunction with the Overseas Club for the establishment of branches of the Overseas Aerial League throughout the Dominions and Colonies, one of the principal objects of which is the provision of landing grounds for airmen wherever practicable.

This development has been attended with most satisfactory results.

A branch has been started in Canada under the auspices of the Governor-General (The Duke of Devonshire, K.G., &c.), and with the support of the Rt. Hon. Sir Robert L. Borden, G.C.M.G., P.C., and other influential gentlemen.

A commencement has also been made in Australia with the assistance of the Governors in each State. Branches will also be organised in various outlying, but important, outposts of the Empire which will be of great importance to this

Imperial movement. This alone will prove to you that the Aerial League is in anything but a moribund condition.

I would also refer to the Royal Flying Corps Families' Relief Fund which we have organised at the special request of General Sir David Henderson, K.C.B., for the relief of the dependants of non-commissioned officers and men of the Royal Flying Corps who lose their lives on active service, from which we have assisted a large number of families. This fund was recently registered under the War Charities Act, 1916.

The paragraph which you inserted in your issue of December 26th referring to the Royal Aero Club applies equally to the Aerial League, viz.:—

"Again it falls to be recorded that although the Royal Aero Club has still had to hide its light under a bushel, so far as public activities are concerned, it has, nevertheless, accomplished a great deal of very useful work during the year."

I shall be glad if you will kindly insert this letter in your next issue.

H. T. ARBUTHNOT,
Major-General, Chairman.

Windsor House, Kingsway, London, W.C., Jan. 15th, 1917.

NOTES ON AEROPLANE

SHOCK ABSORBERS OF RUBBER.

By J. C. HUNSAKER, ^{II} Eng.D.

THE design of rubber shock absorbers or springs for aeroplane landing carriages is very unsatisfactory from an engineering standpoint because of uncertainty with regard to the mechanical properties of the rubber. Rubber is in almost universal use for medium and light weight aeroplanes, and there appears to be no other material so well adapted to this particular employment.

It is notorious that landing carriages are easily broken by rough landing, and rule of thumb in design gives no idea of the causes of such failures nor the factor of safety present. Consequently, I have endeavoured to compile data upon the mechanical properties of such rubber as is commonly used on aeroplanes, and to apply the results to design.

It appears that the commercial grade of rubber springs on the market is not in every way what one would desire. The elongation permissible is small, which allows only a small travel for the landing gear in which the energy of landing must be absorbed. The shock to the aeroplane is accordingly very severe, and it is remarkable that there are not more accidents.

Rubber Manufacture.*

Processes of manufacture include: the breaking down and washing of the crude rubber, compounding or mixing with reclaimed rubber or shoddy, rubber substitutes, sulphur and mineral fillers, &c. The effect upon the mechanical properties of the finished product of the various compounding materials is the technique of the manufacturer.

R. H. Upson, of the Goodyear Tyre and Rubber Co., has been so kind as to give me the following classification of the compounding materials in common use:—

"(1) Crude rubber, including hard, medium, soft and very soft, also gutta percha, gutta siak and balata. Rubber forms the basis of all good quality rubber goods. The kind or quality of the rubber determines to a large extent the quality of the cured finished article.

"(2) Reclaimed rubber; used mainly as a cheapener or filler. The properties of a reclaim and the properties which it has a tendency to impart to a stock, depend largely upon the kind of scrap from which it is reclaimed.

"(3) Rubber substitutes; used mainly as light gravity fillers.

"(4) Bitumens; tars, pitches, mineral rubber, and asphalt, are all of similar nature. They are used mainly as cheap binders, or to facilitate the processing of the stock, such as mixing and frictioning.

"(5) Resins; used mainly as cheapeners and fillers and exert a binding effect on the dry mineral powders.

"(6) Waxes; ceresin, paraffin, beeswax, ozokerite, used for special purposes such as for obtaining a gas tight film and to obtain special results in hard rubber.

"(7) Fats and oils; cottonseed oil, rosin oil, castor oil, paraffin oil, and vaseline, used mainly to facilitate mixing and handling of the stock.

"(8) Mineral powders; this is such a large class that it should be considered under the following sub-classes, although some of the materials partake of the properties of two or more of these sub-classes:

"(a) Vulcanising agents; which include sulphur as the only one commonly used. Sulphur chloride is used in vapour or dip curing.

"(b) Accelerators; which hasten and modify the combination of rubber and sulphur, including lime, magnesia usta, magnesium carbonate, antimony sulphide, litharge and most other lead compounds.

"(c) Special properties; some powders are added for the special properties which they give the compound. The most important is zinc oxide, with its peculiar toughening properties. Graphite and lamp black also belong to this class.

"(d) Cheapeners or fillers; including whiting, barytes, talcs and clays.

"(e) Pigments, which are used principally for the special colour they produce, including lithopone, U.M. blue, English vermilion, zinc yellow, lamp black, iron oxide, &c."

In the process of vulcanising, rubber with which sulphur has been mixed is heated to a temperature above the melting point of sulphur. The rubber and combined sulphur make a new chemical compound of much greater strength and elasticity, which is furthermore less affected by temperature changes than the original crude rubber. The chemical for-

mula for rubber gum is not yet known with certainty, but is of the form $(C_{10}H_{16})_n$ and each group $C_{10}H_{16}$ unites with two atoms of sulphur when vulcanised.

There is no standard method for the chemical analysis of rubber. It is usual to remove mechanical impurities and water-soluble matter by washing. Then the sulphur, mineral oils, waxes and resins are extracted with acetone. The sulphur content of the extract is found by ordinary methods, and the solid residue, "organic extract" or "corrected acetone extract," is weighed. This resinous matter should not exceed 5 per cent. of the rubber in the compound for high grade material.

Mechanical Properties of Rubber in General.

In general, we may expect that with the very best grades of rubber and the utmost skill in compounding and vulcanising the tensile strength of rubber may be about 2,000 lb. per sq. in. Such rubber may be stretched to about six times its original length. Ordinary commercial rubbers do not approach these figures.

In any rubber the stress-strain curve is not a straight line, and hence there is no proper modulus of elasticity, as is the case with metals below their elastic limit. However, for engineering purposes it is sufficient in rough calculations to estimate the general slope of the stress-strain curve assumed to be a straight line. In the design of aeroplane landing carriages, an extension of less than 300 per cent. is contemplated for the rubber, and over this range the modulus of elasticity or the slope of the above curve does not change rapidly.

Rubber differs from the metals in having a large "hysteresis factor." That is: when a rubber band has been stretched and the values of load and elongation plotted it is found as the load is gradually removed that the rubber does not contract so rapidly as before and the return curve makes with the first curve a "hysteresis loop" representing work done on the rubber which is not restored. This work lost represents the shock absorbing quality of the rubber. The work lost in hysteresis in low grade heavily compounded rubber may be as much as 70 per cent. of the work done upon first elongation. Better grade rubbers show a hysteresis loss of about 40 per cent.

It would appear that the poor grade rubber had the advantage as a shock absorber. However, under repetition of the load cycle the hysteresis factor for the heavily compounded stock tends to approach that for the pure gum. Furthermore, the cheaper stock does not stretch so far nor age so well as the other.

After stretching and release, heavily compounded rubber takes a large permanent set which will in time nearly disappear. The pure gum stock has less set, recovers more quickly and has a more stable characteristic curve.

On an aeroplane landing carriage, the rubber takes up the first shock of landing as a suddenly applied load which is quickly removed. On this first cycle the hysteresis loop will be large and the aeroplane will be thrown back with only about half the energy with which it stretched the rubbers. Running over the ground, a rapid succession of bumps will cause the rubbers to go through stress-strain cycles with such rapidity that there is no time for recovery of the permanent set given by the first cycle. The hysteresis factor may now be only 25 or 30 per cent. This is exactly what we desire—a damped spring to take up the minor bumps caused by inequalities in the ground.

Methods of Testing.

As there is no standard method for chemical analysis of rubber, so there is no standard method for mechanical testing. Frequently a small straight strip is pulled in the jaws of a testing machine. The rate at which the load is applied and released, number of cycles, &c., have an important effect upon the result.

For aeroplanes, rubber is most commonly employed in the form of a loop or ring. Tests made on a ring show a lower tensile strength than similar tests made on a straight strip of the same rubber, due to the difference in tension between the outside and inside layers of the ring and to change in cross-section. In view of use on an aeroplane, rubber rings should give better figures for use in design.

Tests at the Bureau of Standards (*loc. cit.*) showed that the rate of loading has only a secondary effect upon the results of the test. Change of temperature showed somewhat more effect. An increase from 50 deg. F. to 90 deg. F. showed an average 10 per cent. decrease in tensile strength, 10 per cent.

*References: Circular No. 38 of the Bureau of Standards, *The Testing of Mechanical Rubber Goods*; *India Rubber*, by P. Schidrowitz; *Crude Rubber*, by H. C. Pierson; *Der Kautschuk und seine Prüfung*, by Hinrichsen and Memmler. Also articles in *India Rubber Journal*.

increase in elongation and 30 per cent. decrease in permanent set.

In some tests made at the Massachusetts Institute of Technology by Mr. Huff, the actual rubber rings as supplied to aeroplane builders were slipped over $\frac{1}{2}$ -in. bolts (the size used on the aeroplane) shackled to the head of an ordinary wire testing machine. Temperature for all tests was about 70 deg. F., and the load was applied slowly, about 1 in. in 30 seconds.

Elongation and Tensile Strength.

Four specimens of "Wright type" rubber rings, Grade A, mean diameter 2 ins., width 2 ins., thickness $\frac{5}{16}$ in., broke on

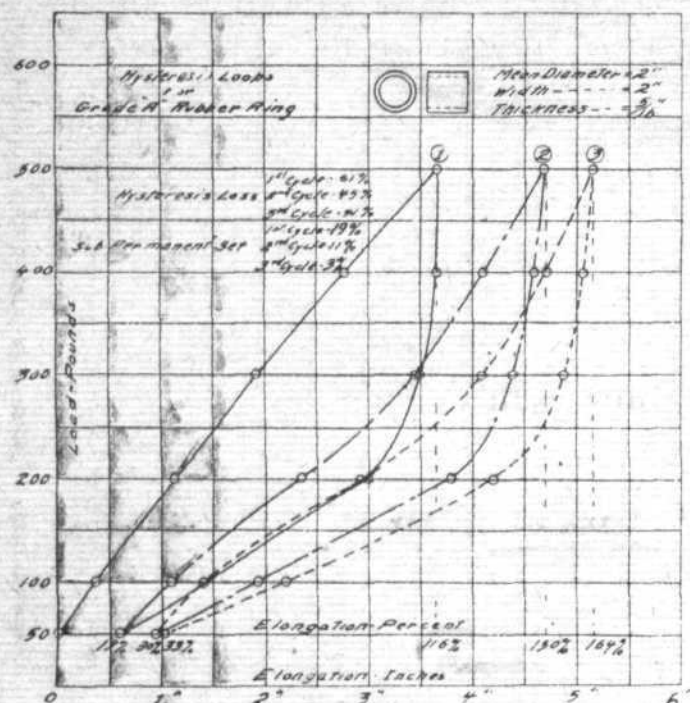


Fig. 1.—Hysteresis loops for Grade A rubber ring.

an average at 900 lb. per sq. in. and showed an average ultimate elongation of 265 per cent. of the initial length. The initial length was reckoned as the half mean perimeter. The tensile strength is computed on a basis of the original cross-sectional area.

Two specimens of the same type and grade of rubber which had been kept in an office for one year showed a tensile strength of 750 lb. per sq. in. and ultimate elongation of 240 per cent. The effect of age seems to be not very serious.

Tests on two specimens of "Farman type" rings, Grade A, mean diameter 5.5 in., width 1 in., thickness $\frac{1}{4}$ in., gave as average values 800 lb. per sq. in. and 300 per cent. elongation.

Two rings, 2 ins. x 2 ins. x $\frac{5}{16}$ in., made of another grade, B, of rubber (obviously inferior) showed a tensile strength of 525 lb. per sq. in. and an ultimate elongation of only 200 per cent. Thus these rings could only be trebled in length when rupture occurred. To all external appearance these poor rings were no different from the lot first tested.

To the aeroplane designer it is very necessary to know how far the rubbers may safely be allowed to stretch. It will be noted that the best of these rings do not approach the tensile strength of 2,000 lb. per sq. in. and an elongation of 600 per cent. which we assume good rubber can be made to show.

Hysteresis Loss.

The curve of Fig. 1 shows the stress-strain curve for one of the "Wright type" rings for three cycles. The runs were continuous with no time interval to get the exact permanent set. That given is without waiting more than three minutes for more complete recovery from strain. The hysteresis loss, or ratio of area of loop to area under ascending stress curve is becoming smaller, and from 61 per cent. for the first cycle is only 41 per cent. for the third cycle. The sub-permanent set is almost entirely given by the first cycle and is not great.

Similar hysteresis curves were found for many other specimens, but without material difference in character. The hysteresis losses given above may be taken as representative of commercial aeroplane supplies. Rubbers of this grade are in general use in the United States, and appear to be fairly satisfactory for the lighter aeroplanes.

Fig. 2 shows the hysteresis loops for the samples of B grade rubber mentioned above in connection with the tests on ultimate strength and elongation. The curve of the first

cycle is somewhat startling in appearance, giving a hysteresis loss of about 89 per cent. The sub-permanent set after the first cycle is relatively enormous. For the first blow, this rubber should be an ideal shock absorber were it not for the low tensile strength and small allowable elongation. As a matter of fact, the rubber from which these rings were made was originally developed for bumpers on railroad equipment, where only compression loads are considered. It is not a suitable grade for tension work.

Modulus of Elasticity.

As mentioned above, there is no real modulus of elasticity for rubber, but we find useful an approximate figure representing the slope of a straight line which roughly represents the ascending curve of the stress-strain diagram. We have

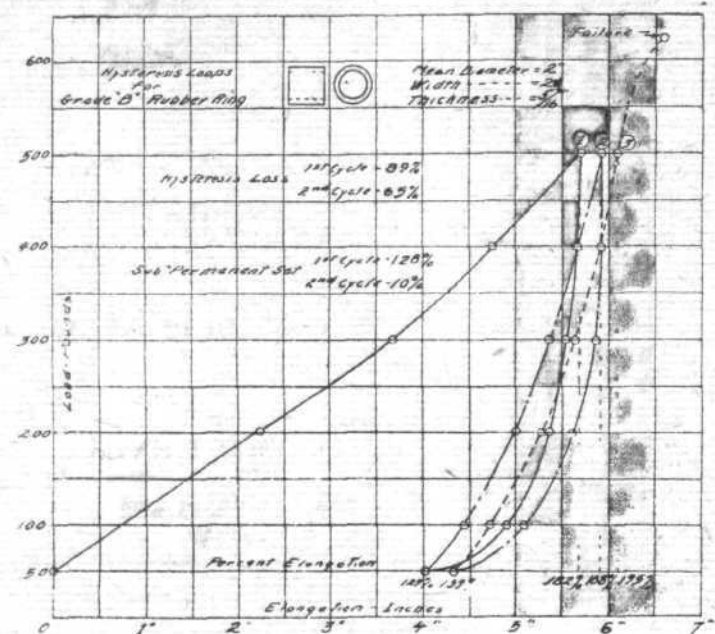


Fig. 2.—Hysteresis loops for Grade B rubber ring.

here taken the ascending curve of the first cycle for the computation of E in the expression:

$$f = E \frac{e}{100}$$

where f is ultimate stress in lbs. per sq. in., E is modulus of elasticity and e is ultimate elongation in per cent. of original length.

From tests on Grade A rubber rings, we find E for four specimens 350, 340, 310, 265 lb. per sq. in. The Grade B rubber, two specimens gave $E = 275$ and 250. For Grade A rubber we may take $E = 300$ as a safe figure. If we compute E for the part of the stress-strain diagram below 50 per cent. of breaking load, we find an average value of about 250 lb. per sq. in.

Test of Complete Shock Absorber.

A bridge type shock absorber made for an actual aeroplane was tested by Lieuts. B. Q. Jones and H. A. Harms, U.S. Army. The general arrangement is shown in Figs. 3, 4, 5. There were

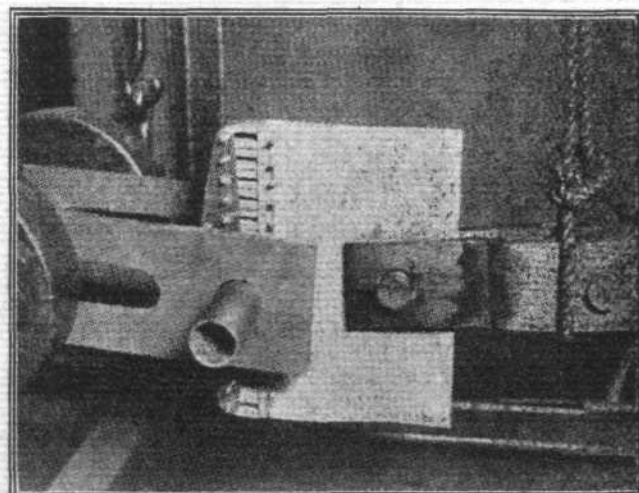


Fig. 3.—Bridge type shock absorber ready for test.

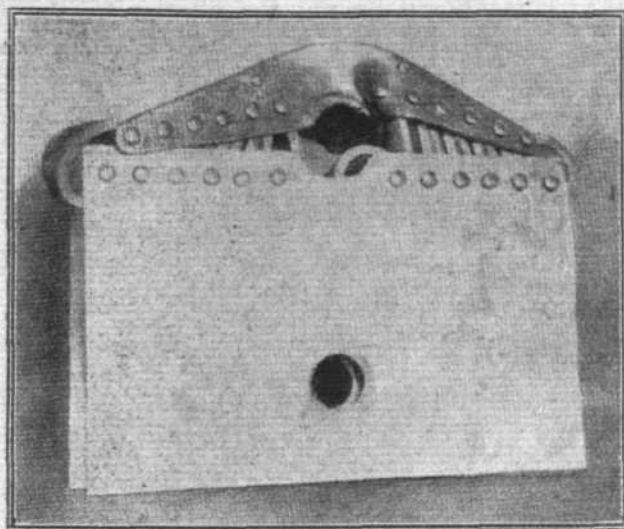


Fig. 4.—The landing gear bridge with twelve rubber rings.

fitted 12 rubber rings 2 ins. \times 2 ins. \times $\frac{5}{16}$ in., similar to those described above in connection with Grade A rubber. Each ring was passed over a $\frac{1}{4}$ -in. steel pin.

The laboratory report of the test follows:

Department of Mechanical Engineering,
Massachusetts Institute of Technology,
Testing Materials Laboratory, Dec. 21st, 1915.

HYSTERESIS TEST ON AEROPLANE SHOCK ABSORBER, AND
TEST FOR ULTIMATE STRENGTH OF SAME.

Specimen:

Axle—Shelby tubing, 2 ins. in diameter by $\frac{1}{2}$ in. thick.
Bridge and plate—Cold rolled steel, $\frac{1}{2}$ in. thick.
Rubbers—Twelve 2 in. \times $\frac{5}{16}$ in. commercial rubber rings.
Pins— $\frac{1}{4}$ in. steel.

The Test:

The elongations at the various loadings were obtained by taking the distance (average) between four pairs of centre punch marks.

Three runs for hysteresis were made as follows:

First Run.		Second Run.		Third Run.	
Load.	Elongation.	Load.	Elongation.	Load.	Elongation.
Lbs.	Ins.	Lbs.	Ins.	Lbs.	Ins.
500	—	—	—	—	—
1,000	.22	1,000	.48	1,000	.52
1,500	.48	—	—	—	—
2,000	.78	2,000	1.25	2,000	1.37
2,500	1.10	—	—	—	—
3,000	1.40	3,000	1.98	3,000	2.12
3,500	1.70	—	—	—	—
4,000	2.08	4,000	2.45	4,000	2.60
3,500	2.07	—	—	—	—
3,000	1.98	3,000	2.26	3,000	2.45
2,500	1.83	—	—	—	—
2,000	1.57	2,000	1.74	2,000	1.91
1,500	1.10	—	—	—	—
1,000	.65	1,000	.70	1,000	.78
500	.21	500	.23	500	.28

At the beginning of the test, with an initial load of 500 lb., the average distance between centre punch marks was 2.27 ins.

A fourth run was then made for ultimate strength. At a load of 9,750 lbs., with a corresponding elongation of 5.06 ins., the lower bridge failed by buckling under the axle, and one pin at that point failed by shearing off on the inside of the plate. At the time of the failure there was a pronounced odour of hot rubber, but none of the rubbers failed.

(Signed) B. Q. JONES,
H. A. HARMS.

Discussion of Results.

Fig. 6 is a plot of the three cycles of the hysteresis run. The hysteresis loss drops from 47 per cent. to 28 per cent. as would be expected. The sub-permanent set is practically constant at about 10 per cent. after the first cycle. For the hysteresis tests the load was run up each time to 41 per cent. of the load which ultimately broke the bridge. At this point, 4,000 lb., the stress in the rubbers was only 267 lb. per sq. in., which appears to account in a qualitative way for a lower hysteresis loss than we had found for the individual rubbers when carried to a higher stress. In this connection it is of

interest to observe that the hysteresis loss is greater for greater elongations.

The initial length of an unstretched rubber is taken as the half mean perimeter or 3.14 in. The bridge failed at a load

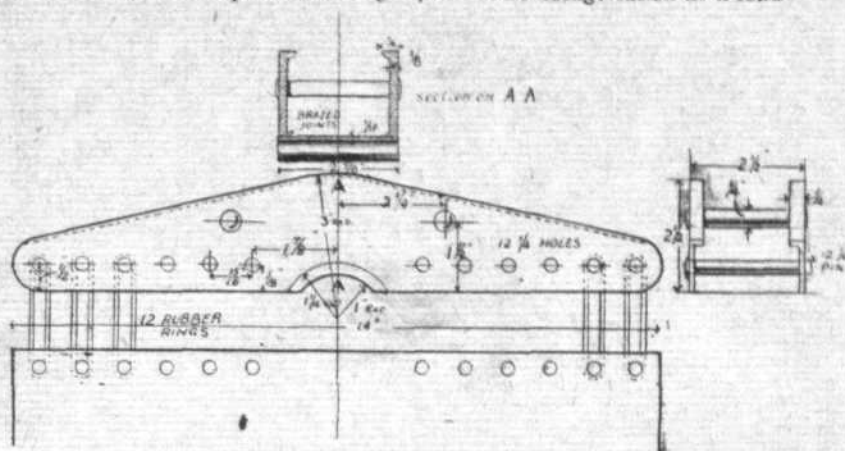


Fig. 5.—Detail of construction of landing gear bridge used in test.

of 9,750 lb., at which point the rubbers had stretched 161 per cent. more than the original length and were stressed 650 lb. per sq. in. From previous tests these rubbers were found to break at about 900 lb. per sq. in.

The modulus of elasticity computed from $\frac{100f}{e} = \frac{650}{1.61} = 400$ lb. per sq. in. This is somewhat greater than the highest value, 350, got from tests on individual rubbers. Here again the discrepancy comes from the fact that the rubbers in the two cases were not equally stressed.

The buckling of the bridge before the rubbers were fully elongated shows this landing gear in service might collapse on hard landing. Ordinarily a movement of 5 ins. for the shock absorbing mechanism is small.

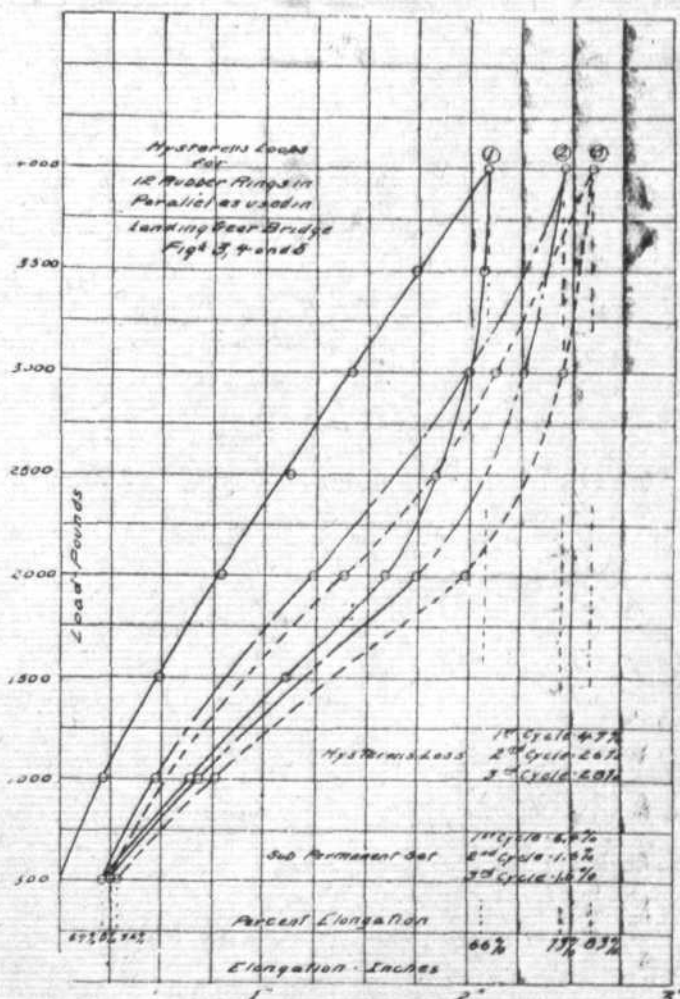


Fig. 6.—Hysteresis loops for twelve rubber rings in parallel as used in landing gear bridge, Figs. 3, 4, and 5.

An aeroplane weighing W pounds striking the ground at V feet per second on a glide of 1 in 7 has kinetic energy to be absorbed by the landing gear of $\frac{W(V)^2}{2g(7)^2}$. If the machine comes to rest after a motion of x feet, the work done by gravity on it is Wx , and the total energy stored in the shock absorber is $W\left\{x + \frac{1}{2g}\left(\frac{V}{7}\right)^2\right\}$. The average force in the springs is half the maximum F , given by the equality:

$$\frac{1}{2}Fx = W\left\{x + \frac{1}{2g}\left(\frac{V}{7}\right)^2\right\}$$

or

$$F = W\left\{2 + \frac{1}{xg}\left(\frac{V}{7}\right)^2\right\}$$

If we take ordinary conditions as $V = 66$ ft. per second (45 m.p.h.), $F = W(2 + \frac{5.7}{x})$, from which we get the following table for use in design:—

x	F	x	F	x	F
1 in.	68 W	5 ins.	13.7 W	10 ins.	6.8 W
3 ins.	23 W	6 ins.	11.5 W	12 ins.	5.7 W
4 ins.	17 W	8 ins.	8.6 W		

(It appears that the load on the landing gear is nearly 14 times the weight of the aeroplane, if a motion of only 5 ins. is allowed. This requires an excessive factor of safety and makes a very heavy construction. Of course, no allowance has been made for the collapse of pneumatic tyres, which may add 2 ins. to the motion of the recoil mechanism.

For our particular gear, failure comes at 9,750 lbs. for a motion of 5 ins. This gear then should not be used on aeroplanes weighing more than $\frac{2 \times 9,750}{13.7} = 1,425$ lbs. total

if they are expected to land at so steep a glide and at a speed of 45 m.p.h. The gear is of the type used to-day on 3,000-lb. aeroplanes, and it is clear why their landing requires such delicate handling.

The bridge under test failed by buckling due to insufficient bracing between the webs. This is purely a fault in design and for a very slight increase in weight a bridge of similar type can be made which will develop the full strength of the rubber. For example, each rubber may be assumed to break for a load of about 1,100 lbs. after stretching 8.5 ins., according to tests made on individual rubbers. Then the maximum load from the previous table is 8.15 W , and the gear could be used on an aeroplane of weight less than

$$W = \frac{24 \times 1,100}{8.15} = 3,240 \text{ lb.}$$

Improved Rubber Required.

It is believed that if an improved grade of rubber were developed for aeroplane landing gear, the heavier machines would not now be so difficult to land. For example, if the same 24 rubber rings were made of a grade of rubber which would stretch 12 ins. safely, the load on the landing carriage would be only 5.7 times the dead weight, according to our table. Remember that this table is computed on a basis of severe landing conditions. Rubber giving a tensile stress at this elongation only equal to that of the present rings at 8.5 ins. elongation would require the same bridge design as before, but the factor of safety in the structure of the landing carriage could be halved with an important saving in weight. Increase in tensile strength of the rubber would permit the use of fewer rubbers, but the saving in weight here would be of less importance. It appears, therefore, that elongation is more important from the designers' point of view than

tensile strength. An increase in the motion allowed softens the shock of landing, permits a less rugged landing carriage, as well as many important weight savings in the body and motor foundations.

Bouncing.

For very heavy machines, due to the uncertain nature of rubber and the difficulty of fitting a sufficient number of rings, there is an increasing tendency to fit steel helical springs. Also rubber is an unsatisfactory material to keep as a military store on account of rapid deterioration under the action of extremes of temperature, and especially sunlight. Various devices are resorted to in the compounding to reduce this liability to oxidation.

Steel springs are heavier than rubber, but are so easily fitted that the weight of the landing gear need be hardly any heavier than an equivalent gear with rubber springs when the weight of bridges and all attachments is included. However, due to lack of damping in the steel spring, equivalent to the hysteresis loss in rubber springs, it is necessary to fit oil or pneumatic shock-absorbing mechanism. An undamped steel spring will throw the aeroplane back up into the air with theoretically the same kinetic energy with which it struck the ground.

For example, the total energy stored in the springs when compressed may be:—

$$\text{K.E.} = \frac{1}{2} \frac{W}{g} \left(\frac{V}{7}\right)^2 + Wx.$$

using the previous notation. If the aeroplane has steel springs the K.E. of the aeroplane when the springs have again extended to their initial length is $\frac{1}{2} \frac{W}{g} \left(\frac{V}{7}\right)^2$, the energy of the aeroplane when it first touched the ground. The machine will be thrown into the air a distance of $\frac{1}{2g} \left(\frac{V}{7}\right)^2 = 1.4$ ft. under standard conditions.

With rubber springs showing a hysteresis loss of 50 per cent., the energy returned to the aeroplane is only half of that done on the rubber, or:—

$$\begin{aligned} \text{K.E. final} &= \frac{1}{2} \left[\frac{1}{2} \frac{W}{g} \left(\frac{V}{7}\right)^2 + Wx \right] - Wx \\ &= \frac{W}{2} \left[\frac{1}{2g} \left(\frac{V}{7}\right)^2 - x \right] = \frac{W}{2} [1.4 - x]. \end{aligned}$$

If x , the elongation, is $\frac{1}{2}$ ft. the machine is thrown clear of the ground only 0.45 ft. For an easy landing, such as 1 in 11.7, the machine will not leave the ground after once striking it. The energy of landing is in this case wholly absorbed in the rubber. For smooth ground and a skilful pilot a perfect landing without bounce is the usual thing with rubber landing gear.

On account of the valuable energy dissipating property of rubber, it is doubtful whether, for light aeroplanes, there is any better material. For the heavy machines, over 3,000 lbs., rubber leaves much to be desired. It would be of interest if a grade of rubber could be produced by the manufacturers which would be described roughly by the following specifications:—

Fine Para, at least	..	..	45 per cent.
Total sulphur, not over	..	..	3 per cent.
Free sulphur, not over	..	..	1 per cent.
Acetone extract, about	..	..	2.25 per cent.
Stretch expected	..	..	1 to 6
Tensile strength..	..	1,800 lbs. per square inch.	
Permanent per cent. elongation	..	..	25 per cent.

Anti-Aircraft Guns for U.S. Coastguard Cutters.

THE American Navy are waking up to some of the lessons of the war evidently. It is stated that the new Naval appropriations include estimates for mounting three 3-inch anti-aircraft guns on the United States Coastguard cutters.

A Curtiss Triplane for Miss Law.

MISS RUTH LAW is now contemplating flying across the States from coast to coast, and proposes to use a Curtiss triplane built on similar lines to the one illustrated in "FLIGHT" of November 9th, but with extensions fitted to the two upper planes.

Echo of Recent Record American Flights.

By way of honouring Miss Ruth B. Law for her recent record non-stop flight from Chicago to New York, a banquet was held in the latter city on December 18th. Among the 400 guests were Rear-Admiral Peary and Capt. Roald Amundsen, of North and South Pole fame, as well as many

prominent workers in the American aviation world. Miss Law was presented with a cheque for \$2,500. Mr. Victor Carlstrom, who also flew from Chicago to New York, was unable to be present to receive the gold watch presented to him as a souvenir.

An American Aeroplane Mail Service.

THE recent record flights put up by Victor Carlstrom and Miss Ruth Law between Chicago and New York have evidently aroused some enthusiasm in official circles in the States. A regular aeroplane mail service between the two cities named is, as mentioned last week, in contemplation by the Post Office Department. An average time of 8 hours is anticipated for the 720 miles, whilst a load of from 500 to 1,000 lbs. is expected. Three stopping places en route are proposed, where extra machines, fuel and spare parts would be in readiness. Except for the suggestion that the journeys be made at night, there is no reason why such a project, if properly organised and financed, should not meet with every success.

The British Air Service

"PER ARDUA AD ASTRA"

UNDER this heading are published each week the official announcement of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

Royal Naval Air Service.

Admiralty, January 9th.

Temp. Sub-Lieut., R.N.V.R., K. C. Tilman, entered as Prob. Flight Officer, for temp. service, and appointed to "President," additional, for duty with R.N.A.S., to date Dec. 31st (temporary commission and appointment as Sub-Lieut., R.N.V.R., terminated).

The undermentioned entered as Prob. Flight Officers, and appointed to "President," additional, for duty with R.N.A.S., to date as stated: R. E. Carroll, Nov. 10th; T. C. May, Nov. 21st; E. S. Campbell, Nov. 22nd; T. L. Glasgow, Dec. 7th; W. H. Comstock, G. McK. Calder, D. M. Briden, F. J. Mackie, J. St. James, R. K. McArthur, and H. B. Kerruish, Dec. 14th.

Admiralty, January 10th.

C. B. Hull granted a temp. commission as Sub-Lieut., R.N.V.R., and appointed to the "President," additional for R.N.A.S., to date Jan. 9th.

Royal Flying Corps (Military Wing).

London Gazette, January 9th.

Temporary Appointments at War Office.

G.S.Os., 3rd Grade.—Dec. 13th: 2nd Lieut. H. L. Webb, R.F.C., S.R., from an Equipment Officer, 3rd Class, and to be Temp. Capt. whilst so employed.

Flight Commanders.—From Flying Officers, and to be Temp. Capt. whilst so employed. Dec. 17th: Lieut. G. A. Thompson, Canadian Gen. List; Temp. 2nd Lieut. J. Blackwood, Gen. List.

Flying Officers.—Temp. Lieut. J. C. O. Dickson, Gen. List, from a Flying Officer (Observer), Nov. 7th, but with seniority from May 6th; 2nd Lieut. F. O. Rose, Essex R. (T.F.), Nov. 17th. Dec. 14th: Lieut. W. B. Hutcheson, Canadian Engrs; 2nd Lieut. J. B. Hassell, 11th Australian Inf. Bn.; 2nd Lieut. R. S. Lewis, R.A., and to be seconded; 2nd Lieut. (on prob.) S. H. Bell, S.R.; Temp. 2nd Lieut. (on prob.) G. C. Stead, Gen. List; Temp. 2nd Lieut. (on prob.) R. Roxburgh-Smith, Gen. List. Dec. 15th: Lieut. G. C. Walker, Lowland Divl. Train, A.S.C. (T.F.); Temp. Lieut. G. Graham, Gen. List, from a Flying Officer (Observer), with seniority from Oct. 9th; 2nd Lieut. F. W. Nisbet, York. Dns. Yeo. (T.F.); Temp. 2nd Lieut. G. E. R. Lacey, E. York. R., and to be transferred to the Gen. List. Lieut. T. H. Wickett, 91st Canadian Inf. Bn.; Dec. 17th. Temp. 2nd Lieut. G. N. Brockhurst, Gen. List; Dec. 18th.

Equipment Officers, 3rd Class.—2nd Lieut. J. Morris, from Unattached List (T.F.); Dec. 6th. (Substituted for the notification in the Gazette of Dec. 23rd.) Dec. 15th: 2nd Lieut. (Temp. Lieut.) H. H. Thomas, Welsh Divl. Ammunition Column, R.F.A. (T.F.); Temp. 2nd Lieut. (Temp. Lieut.) J. Durward, attached High. L.I., and to relinquish the rank of Temp. Lieut.

Memorandum.—2nd Lieut. (on prob.) J. A. Myburgh, from R.F.C., S.R., to be Temp. 2nd Lieut. on Gen. List, for duty with R.F.C.; Dec. 7th.

Supplementary to Regular Corps.—2nd Lieut. A. N. Patterson relinquishes his commission on account of ill-health; Jan. 10th, 1917.

London Gazette Supplement, January 10th.

Squadron Commanders, and to be Temporary Majors whilst so employed.—Capt. Lord A. R. Innes-Ker, D.S.O., R.H. Gds., from a Flight Comdr.; Dec. 21st. Lieut. (Temp. Capt.) G. C. de Dombasle, R. Canadian Inf. Regt., from a Flight Comdr. Dec. 28th.

Flight Commanders, from Flying Officers, and to be Temporary Captains whilst so employed.—2nd Lieut. (now Lieut.) B. J. W. M. Moore, M.C., S.R.; Sept. 30th. Dec. 1st: Lieut. G. H. Morton, 3rd Canadian Pioneer Bn.; 2nd Lieut. J. C. Slessor, S.R.; Lieut. E. Selby, S.R.; 2nd Lieut. (Temp. Lieut.) H. F. Champion, Rif. Brig., S.R.; 2nd Lieut. (now Lieut.) E. A. B. Rice, S.R.; 2nd Lieut. E. L. Millar, S.R.; 2nd Lieut. P. Pralle, S.R.; Temp. 2nd Lieut. R. D. Oxland, Gen. List. 2nd Lieut. (Temp. Lieut.) A. P. V. Daly, Conn. Rang., S.R.; Dec. 20th. Capt. H. J. Segrave, Wilts. R. from a Flying Officer; Dec. 21st. From Flying Officers and to be Temp. Capt. whilst so employed: Temp. Lieut. J. M. M'Alery, Gen. List; Dec. 21st. 2nd Lieut. T. Macleod,

S.R.; Dec. 22nd. Temp. Lieut. A. P. Maurice, Gen. List; Dec. 27th.

Flying Officers.—2nd Lieut. C. L. Baldwin, S.R.; Oct. 6th. Dec. 13th: Temp. Lieut. G. M. Cox, R. Berks. R., and to be transferred to Gen. List; Temp. 2nd Lieut. H. E. Davis, S. Staff. R., and to be transferred to Gen. List; Temp. 2nd Lieut. S. O. Smith, Gen. List; Lieut. H. H. Cotton, 5th Canadian Mtd. Rif.; Temp. 2nd Lieut. (on prob.) A. Holden, attached York. R.; Temp. 2nd Lieut. I. W. Parnell, Gen. List. Dec. 14th: Temp. 2nd Lieut. H. E. Scoones, Gen. List, from a Flying Officer (Observer), with seniority from June 21st. 2nd Lieut. J. M. Burd, R.A., from a Flying Officer (Observer), with seniority from Oct. 25th, 1915. Dec. 15th: 2nd Lieut. (Temp. Lieut.) A. W. Todd, E. York. R. (T.F.), from attached Yorks. L.I. (T.F.); Temp. 2nd Lieut. (Temp. Lieut.) G. C. H. Dorman, R.E., from a Balloon Officer; Temp. 2nd Lieut. T. H. French, Gen. List. Dec. 16th: Temp. Lieut. D. A. D. S. MacGregor, Gen. List, from a Flying Officer (Observer), with seniority from April 19th; 2nd Lieut. E. V. A. Bell, Hamps. R., and to be seconded; Lieut. L. P. Prior, Lond. R. (T.F.), from attached 12th Lond. R. (T.F.); Temp. 2nd Lieut. F. L. Kitchin, attached Glouc. R.; Temp. 2nd Lieut. J. B. Hine, Gen. List; 2nd Lieut. H. P. Reid, S.R.; 2nd Lieut. R. J. Stubington, Hamps. R. (T.F.). Dec. 17th: 2nd Lieut. (Temp. Lieut.) E. R. H. Beaman, Home Counties Divl. Engrs., R.E. (T.F.); Dec. 18th. Dec. 19th: Temp. 2nd Lieut. (Temp. Capt.) C. G. Eccles, R.W. Kent. R., to relinquish the rank of Temp. Capt., and to be transferred to Gen. List; Lieut. E. E. H. Jackson, Suff. R., S.R., and to be seconded; Temp. Lieut. E. L. Heyworth, Manch. R., and to be transferred to Gen. List; 2nd Lieut. L. H. Gibbon, S.R.; Temp. 2nd Lieut. R. M. Marsh, Gen. List.

Balloon Officers.—Nov. 7th: 2nd Lieut. (on prob.) H. D. Pashley, S.R. (since decd.); Temp. 2nd Lieut. W. H. Scanlan, Gen. List; Temp. 2nd Lieut. A. D. Mackay, attached Arg. and Sutthd. Highrs.; Temp. 2nd Lieut. W. J. G. Armiger, Gen. List; 2nd Lieut. (on prob.) E. Blore, S. Wales Bord., S.R., and to be seconded. Nov. 21st: Lieut. P. H. Drury, S. Wales Bord., and to be seconded; 2nd Lieut. A. S. A. Herne, Middx. R. (T.F.). Nov. 22nd: 2nd Lieut. (Temp. Capt.) R. M. A. Edlundh, Lond. R. (T.F.); Temp. 2nd Lieut. S. Jennings, York. R., and to be transferred to Gen. List; 2nd Lieut. R. I. Page, R. Fus., S.R., and to be seconded. Nov. 27th: Lieut. J. K. T. Glen, High. L.I. (T.F.); Temp. Lieut. V. D. Drury, R.E. Temp. 2nd Lieut. H. H. T. Potter, Gen. List; Dec. 17th. 2nd Lieut. A. E. B. Craddock, Arg. and Sutthd. Highrs. (T.F.); Dec. 19th.

Equipment Officer, 2nd Class.—Lieut. R. K. Pillers, Northn. R., S.R., from the 3rd Class; Dec. 22nd.

Equipment Officer, 3rd Class.—Temp. 2nd Lieut. E. T. Driver, Gen. List; Oct. 2nd. (Substituted for the notification in the Gazette of Dec. 19th.)

Memorandum.—Corpl. H. A. Thomas, from R.F.C., for duty with the Mil. Wing of that Corps; Dec. 18th.

Supplementary to Regular Corps.—W. R. S. Humphreys, from Lieut., 5th Canadian Inf., to be Lieut.; Jan. 11th, 1917.

London Gazette Supplement, January 11th.

Temporary Appointments at War Office.

Staff Lieutenants.—Dec. 19th: 2nd Lieut. T. G. Leith, R.F.C., S.R., from an Equipment Officer, 3rd Class, vice Lieut. St. J. R. Piggott, I. Gds.

Wing Commander.—Lieut. (Temp. Major) G. F. Pretyman, D.S.O., Som. L.I., from a Sqdn. Comdr., and to be Temp. Lieut.-Col. whilst so employed; Dec. 28th.

Flight Commanders.—From Flying Officers, and to be Temp. Capt. whilst so employed: 2nd Lieut. A. F. Brooke, 10th Hrs.; Nov. 7th. 2nd Lieut. P. Huskinson, M.C., Notts. and Derby. R.; Dec. 19th. Dec. 22nd: 2nd Lieut. (Temp. Lieut.) S. P. Smith, Wessex. Divl. Train, A.S.C. (T.F.); Lieut. J. G. Selby, R.A.; Lieut. R. J. Lowcock, Notts. and Derby. R.; Capt. C. E. Bryant, D.S.O., 7th Hrs., from a Flying Officer. From Flying Officers, and to be Temp. Capt. whilst so employed: Temp. Lieut. A. Duguid, Gen. List; Temp. 2nd Lieut. S. S. Halse, Gen. List. Lieut. (Temp.

Capt.) L. P. Aizlewood, M.C., York. and Lanc. R. (T.F.), from a Flying Officer; Dec. 24th. From Flying Officers and to be Temp. Capt. whilst so employed: Temp. 2nd Lieut. C. E. W. Foster, Gen. List; Dec. 26th. Dec. 27th: Temp. 2nd Lieut. (Temp. Lieut.) G. B. A. Baker, Gen. List; Lieut. H. E. Hartney, Canadian Local Forces. Temp. Capt. R. N. Thomas, Gen. List, from a Flying Officer. From Flying Officers and to be Temp. Capt. whilst so employed: 2nd Lieut. C. Holland, S.R.; Temp. 2nd Lieut. C. J. W. Crichton, Gen. List. Lieut. F. V. Woodman, Canadian Gen. List; Dec. 28th. 2nd Lieut. C. H. C. Woollven, M.C., Devon R.; Dec. 31st. Jan. 1st, 1917: 2nd Lieut. G. T. H. Hill, M.C., S.R.; 2nd Lieut. W. H. Hubbard, S.R.

Flying Officers.—Capt. E. V. Andreini, Bedf. R. (T.F.); Nov. 5th. Nov. 27th: 2nd Lieut. (Temp. Lieut.) J. L. Vachell, Welsh Brig., R.F.A. (T.F.); 2nd Lieut. N. J. Wenger, Staff. Yeo. (T.F.); 2nd Lieut. G. F. Welch, Ind. Army Res. of Off. Nov. 28th: 2nd Lieut. (Temp. Lieut.) A. J. Lazarus-Barlow, R.E., Kent Yeo. (T.F.); Lieut. G. E. C. Collinson, Camn. Highrs., S.R., and to be seconded. Nov. 29th: 2nd Lieut. J. Hutcheson, Sco. Rif., S.R., from attached R. Ir. Regt.; 2nd Lieut. J. L. Toyne, Dorset R., S.R., and to be seconded; 2nd Lieut. J. S. Harvey, R. Dub. Fus., S.R., and to be seconded; Temp. 2nd Lieut. F. J. Gibbs, attached S. Staff. R. Nov. 30th: Capt. F. Wyatt, Suff. R. (T.F.); Temp. 2nd Lieut. A. H. C. A. Rawson, attached R. War. R. Lieut. W. P. Garnett, R. Berks. R., S.R., and to be seconded; Dec. 16th. Temp. 2nd Lieut. M. Dodd, L'pool. R., and to be transferred to Gen. List; Dec. 17th. Dec. 19th: Temp. Lieut. H. M. Ayres, attached Middx. R.; Temp. 2nd Lieut. C. H. Bird, Welsh R., and to be transferred to Gen. List; Temp. 2nd Lieut. J. W. Eyton-Lloyd, Gen. List. Lieut. M. Halligan, R. Dub. Fus., and to be seconded; Dec. 20th, 1916. 2nd Lieut. C. W. Odell, R. Innis. Fus. and to be seconded; Dec. 21st. Lieut. G. E. W. Hitchcock, R.E., S.R.; Dec. 22nd. 2nd Lieut. (Temp. Capt.) E. Fletcher, N. Mid. Divl. Train, A.S.C. (T.F.); Dec. 23rd. 2nd Lieut. (on prob.) F. A. Smith, S.R.; Dec. 24th. Temp. 2nd Lieut. A. R. C. Cooper, Rif. Brig., and to be transferred to Gen. List; Dec. 25th. Dec. 28th: Temp. 2nd Lieut. T. Shepard, attached R. War. R. 2nd Lieut. (on prob.) E. D. MacKay, S.R.

Balloon Officers.—Dec. 19th: 2nd Lieut. L. W. Thompson, Middx. R. (T.F.); Temp. 2nd Lieut. J. H. Jenkinson, R.W. Fus., and to be transferred to Gen. List; Temp. 2nd Lieut. C. W. M. Whitlock, Wilts. R., and to be transferred to Gen. List; Temp. 2nd Lieut. H. P. D'O. Hills, attached K.O. Sco. Bord.; 2nd Lieut. A. Rowbottom, Bord. R. (T.F.); 2nd Lieut. A. T. Potter, Bord. R. (T.F.).

Equipment Officer, 2nd Class.—Temp. 2nd Lieut. D. P. Geddes, Gen. List, from the 3rd Class, and to be Temp. Lieut. whilst so employed; Dec. 9th.

Equipment Officers, 3rd Class.—Temp. 2nd Lieut. (on prob.) E. Drudge, Gen. List; Oct. 26th. Lieut. G. L. Godden, S.R., from a Flying Officer; Nov. 14th. 2nd Lieut. W. E. Nuttall, S.R.; Nov. 23rd. 2nd Lieut. N. Martin, S.R.; Dec. 5th. Dec. 6th: 2nd Lieut. W. H. G. Furnivall, S.R.; 2nd Lieut. A. G. Griggs, S.R.; Temp. 2nd Lieut. (on prob.) T. V. Brake, Gen. List; Temp. 2nd Lieut. (on prob.) G. Lacey, Gen. List; 2nd Lieut. (on prob.) B. V. N. Rowcroft, S.R.; 2nd Lieut. (on prob.) F. H. Tyas, S.R. 2nd Lieut. S. Blackley, S.R.; Dec. 9th. 2nd Lieut. J. G. Wilson, S.R.; Dec. 13th. 2nd Lieut. J. G. Hope, S.R.; Dec. 14th. 2nd Lieut. (on prob.) H. D. Lehmann, S.R.; Dec. 16th. Dec. 22nd: Temp. 2nd Lieut. (on prob.) E. M. Cashmore, Gen. List; 2nd Lieut. A. M. Saywood.

Memorandum.—Sub-Lieut. F. H. B. Wise, from R.N.V.R., to be Temp. Lieut. on Gen. List, for duty with R.F.C.; Nov. 16th.

London Gazette, January 12th.

The undermentioned to be Temp. 2nd Lieuts. (on prob.):—**For duty with R.F.C.**—Corpl. H. A. Johnson, from R.E. (T.F.); Nov. 2nd. Corpl. D. H. Simmons, from R.F.C.; Dec. 10th. Dec. 11th: Sergt. C. L. Mitchell, from Middx. R.; Pte. H. A. Dyer, from A.S.C. Dec. 16th: Sergt. L. C. F. Clutterbuck, from Mach. Gun Corps; Sergt. F. G. Taylor, from H.A.C. (T.F.); Pte. W. A. C. Allen, from R.A.M.C. Sergt. H. Brown, from R.F.C.; Dec. 18th.

Temporary Appointments at War Office.

Staff Lieutenants (from Equipment Officers, 3rd Class).—2nd Lieut. F. B. Burton, R.F.C., S.R., vice 2nd Lieut. C. H. Whittington, R.F.C., S.R.; Dec. 14th. Temp. Lieut. B. J. Wolfe-Barry, Gen. List, vice Temp. 2nd Lieut. H. M. Bentley, Gen. List; Dec. 18th.

Flying Officers.—2nd Lieut. (on prob.) H. E. Duncan, S.R.; Dec. 13th. Dec. 23rd: Temp. Lieut. P. T. Newling, Gen.

List; 2nd Lieut. N. C. Saward, N. Mid. Brig., R.F.A. (T.F.); 2nd Lieut. G. Gibbons, Lond. R. (T.F.); Temp. 2nd Lieut. D. F. Cox, Gen. List. Dec. 24th: Lieut. E. Gribben, R. Ir. Rif., S.R., and to be seconded; Capt. J. G. Archdale-Porter, D.S.O., 9th Lrs., and to remain seconded; 2nd Lieut. J. A. D. Wallis, Lond. R. (T.F.); Temp. 2nd Lieut. G. O. Venn, Gen. List; 2nd Lieut. F. Bower, Northd. Fus., and to be seconded; Temp. 2nd Lieut. J. G. Kidd, Gen. List, from attached 36th Jacob's Horse, Ind. Army. Dec. 26th: 2nd Lieut. O. T. Walton, S. Lan. R., S.R., and to be seconded; 2nd Lieut. R. J. Cullen, R. Highrs. (T.F.); 2nd Lieut. L. B. Blaxland, S.R.; Lieut. W. E. Molesworth, R. Muns. Fus., and to be seconded; Temp. 2nd Lieut. P. F. Fullard, Gen. List; 2nd Lieut. H. S. Brackenbury, S.R.; Temp. 2nd Lieut. T. V. Villiers, Gen. List. Dec. 27th: Temp. 2nd Lieut. T. M. O'Neill, R. Dub. Fus., and to be transferred to Gen. List; 2nd Lieut. F. St. V. Morris, Notts. and Derby. R. S.R., and to be seconded; Temp. 2nd Lieut. (on prob.) C. G. Turpin, R. Fus.; Temp. 2nd Lieut. (on prob.) D. A. Page, attached Ches. R.

Equipment Officer, 1st Class.—Lieut. E. I. Bingham, S.R., from the 3rd Class, and to be Temp. Capt. whilst so employed; Dec. 21st.

Equipment Officers, 3rd Class.—2nd Lieut. A. E. Fincher-Brookes, S.R.; July 8th. Temp. 2nd Lieut. (on prob.) T. E. Pennington, Gen. List; Dec. 22nd.

Experimental Officer, 1st Class (graded as an Equipment Officer, 1st Class).—Capt. H. R. Raikes, E. Kent R., S.R. from a Flying Officer; Dec. 15th.

Experimental Officer, 3rd Class (graded as an Equipment Officer, 3rd Class).—2nd Lieut. A. Glynne, S.R.; Jan. 1st, 1917.

Memoranda.—The undermentioned to be Temp. Lieuts. for duty with R.F.C. Oct. 1st: Temp. 2nd Lieut. G. R. Simpson, 2nd Lieut. C. G. Holman, K.O. Sco. Bord. Temp. 2nd Lieuts. A. Broome, H. E. Bagot, R. M. Collingwood, K. M. St. C. G. Leask; J. S. Webb, D. of Corn. L.I.; T. H. Trew, R. M. Hill, M.C.; L. S. Weedon; V. C. Roberts, Northd. Fus.; A. V. Shewell, Glouc. R.; R. Robertson, C. L. Blake, H. G. Bellamy; R. J. E. P. Goode, R. Ir. Fus.; R. D. Elliott, Shrops. L.I.; W. U. P. Powell, E. York. R.; H. G. Bowen, A. T. Hope, G. A. P. Upston.

Supplementary to Regular Corps.—2nd Lieut. H. Baynes is dismissed the service by sentence of a General Court-martial; Dec. 7th. The undermentioned 2nd Lieuts. (on prob.) are confirmed in their rank: A. E. Fincher-Brookes, H. S. Brackenbury, L. B. Blaxland, F. H. Tyas, B. V. N. Rowcroft, H. D. Pashley, A. Glynne. The under-mentioned to be 2nd Lieuts. (on prob.): W. Sillem; Oct. 23rd. L. Crooks; Nov. 21st. D. E. Barnett; Nov. 22nd. Nov. 27th: A. W. Gillespie, F. A. Woolfe, E. S. Crabtree; Dec. 2nd. H. B. Lilley; Dec. 11th. The appointment of 2nd Lieut. (on prob.) R. S. G. MacLean, notified in the *Gazette* of Dec. 7th, is antedated to Oct. 18th. The appointment of 2nd Lieut. P. R. Aitken, notified in the *Gazette* of Nov. 15th is antedated to Oct. 24th.

London Gazette Supplement, January 13th.

Flying Officers.—Temp. Lieut. F. H. V. Wise, Gen. List; Nov. 16th. Temp. 2nd Lieut. (on prob.) W. H. Jones, Gen. List; Dec. 8th. 2nd Lieut. (on prob.) R. Hunt, S.R.; Dec. 9th. 2nd Lieut. A. E. Boulton, Northn. R., S.R. and to be seconded; Dec. 12th. Temp. 2nd Lieut. A. Morrison, Gen. List; Dec. 13th. Dec. 15th: Temp. Lieut. B. Evans, Middx. R., and to be transferred to Gen. List; Lieut. C. L. Graves, 25th Canadian Inf. Bn.; 2nd Lieut. H. B. T. Hope, Northn. R. (T.F.).

Special Appointments.

Graded as Park Commanders.—Qmr. and Hon. Lieut. (Temp. Capt.) J. H. Wilford, R.F.C., from an Equipment Officer, 1st Class, and to be Temp. Major whilst so employed; Oct. 10th. (Substituted for the notification in the *Gazette* of Dec. 28th.) From Equipment Officers, 1st Class—Dec. 21st: Capt. (Temp. Major) C. D. M. Campbell, S.R., and to retain his temp. rank whilst so employed; Lieut. (Temp. Capt.) G. P. Grenfell, S.R., and to be Temp. Major whilst so employed.

Memoranda.—The undermentioned Temp. 2nd Lieuts. to be Temp. Lieuts. for duty with R.F.C. Oct. 31st: R. Stephenson, E. V. Pemberton, H. Brereton, A. N. Nesbitt, J. Kerr, J. B. Graham, N. F. W. Rockey, C. H. B. Readman, F. L. Barnard, J. H. Crutch, L. Reynolds, H. Harris, R. Lanc. R. (attached); J. R. Orrell, Manch. R.; L. C. Burcher, W. A. Dunn, F. D. Jackson, C. E. Maslin, Bedf. R.; W. F. Findlay, W. M. Fry.

Supplementary to Regular Corps.—The undermentioned 2nd Lieuts. (on prob.) are confirmed in their rank: H. E. Duncan, F. A. Smith; E. D. Mackay. The Christian names of 2nd

Lieut. Frederick Harvey Cooper O'Beirne are as now described and not as in the *Gazette* of May 1st.

London Gazette Supplement, January 15th

Flight-Commanders.—From Flying Officers and to be Temp. Cpts. whilst so employed: 2nd Lieut. (Temp. Capt.) G. O. Brunwin-Hales, Essex R. (T.F.); Dec. 22nd. Temp. 2nd Lieut. C. M. Clement, Gen. List; Dec. 26th.

Adjutants.—Capt. E. F. Campbell, K.R. Rif. C., from a Balloon Officer; Dec. 11th. Capt. A. J. R. Waller, Essex R., and to be sec'd.; Dec. 14th. Lieut. J. J. Breen, R. Ir.

Regt., from a Flying Officer, vice Lieut. (Temp. Capt.) C. S. McNab, Cam'n. Highrs.; Dec. 16th.

Equipment Officer, 3rd Class.—Lieut. F. G. Brown, Lowland Brig., R.F.A. (T.F.); Dec. 15th.

School of Aerial Gunnery.

London Gazette Supplement, January 10th.

The appointment of Lieut. (Temp. Major) H. E. Chaney, Lan. Fus., as a Chief Instr., notified in the *Gazette* of Oct. 18th, is antedated to Sept. 1st, without the pay and allowances of that appointment prior to Sept. 13th.



UNDER the above heading will be published weekly particulars of a personal character relating to those who have fallen or have been wounded in the country's service, announcements of marriage and other items concerning members of the Flying Services and others well known in the world of aviation. We shall be pleased to receive for publication properly authenticated particulars suitable for this column.

Casualties.

Commander the Hon. RICHARD ORLANDO BEACONSFIELD BRIDGEMAN, R.N., D.S.O., who has been killed, while flying, in the campaign in East Africa, was a younger brother of the present Earl of Bradford, who is himself serving at the front, as is also their remaining brother, Major H. G. O. Bridgeman, R.H.A. Commander Bridgeman was appointed Flag Commander to the Commander-in-Chief on the Cape station in June, 1914, and had taken part in all the naval operations on the East African Coast. He received the D.S.O. for gallant conduct on the occasion of the attack on Tanga Harbour, and also took part in the destruction of the German cruiser "Königsberg," when he had a narrow escape, a bullet passing through his cap. He had, besides, taken part in the military operations ashore, having acted as liaison officer between the Commander-in-Chief and General Smuts, and had also frequently acted as observer in aerial reconnaissances. Commander Bridgeman was one of the naval officers selected to accompany the King on his State visit to India for the Durbar, and commanded the naval guard-of-honour at Delhi. He had previously served on the China station and at the Cape during the South African war. Commander Bridgeman was a keen sportsman, a good shot, and a good rider to hounds, being well known in the Brocklesby country, where he spent some of his leave in the seasons before the war.

Second Lieutenant EDGAR G. W. BISSET, Gordon Highlanders, attached R.F.C., who has died of wounds, was the second son of Mr. James Bisset, Union Bank, Peterhead, and was 20 years of age. He obtained his commission in December, 1915.

Captain ROWLAND BURDON, R.F.C., who has died as the result of an accident while flying at Tadcaster, was the only son of Colonel Rowland Burdon and Mrs. Burdon, of Castle Eden, County Durham. He was 23 years of age, was educated at Eton and Oxford, where he took his degree in 1914, and received his commission early in the war in the Durham Light Infantry in a battalion raised by his father. He had his captaincy in June, 1915, and, transferring to the Royal Flying Corps in July, was gazetted Flight-Commander in June of last year. He served nine months at the Front, and was invalided home. In December he was appointed an Instructor. He was a keen athlete and won many prizes.

Second Lieutenant H. JAMESON, R.F.C., who has been killed, belonged to Whitby, and was the son of Captain W. Jameson, master of the ss. "Saxon Prince," who is interned at Ruhleben. He held the French Medal Militaire.

Second Lieutenant L. C. FELLOWES LUKIS, Essex Regiment and R.F.C., who has fallen in action, was the second son of Mr. and Mrs. W. R. Fellowes Lukis (now in Australia) and grandson of Major S. T. Smith, R.A., commanding No. 3 Depot, R.F.A., Hilsa. He was in his nineteenth year, and was educated in Switzerland and Wykeham Hall, Lee-on-the-Solent. After passing out of Sandhurst he was gazetted to the Essex Regiment, and subsequently attached to the Royal Flying Corps.

Second Lieutenant ARCHIBALD JOHN MCWHA, R.F.C., third son of Mr. and Mrs. Dupré McWha, of India, late of Bedford, was killed on active service, aged 23. He was educated at Bedford School, and joined the Royal Flying Corps at the beginning of last year as Second Lieutenant.

Flight-Commander E. R. Moon, who has met his death while flying in East Africa, is the eldest son of Mrs. Sims, of Houghton, Bassett, Southampton. He was born in 1886, and educated at Bannister's and Cranleigh schools. On his father's death in 1906 he took over the management of his business, and subsequently started the Moonbeam Co. at Southampton, for the making of motors, aeroplanes, seaplanes and marine engines. When the war broke out he at once applied for a commission. For a considerable time he was stationed at Felixstowe, and about a year ago was sent to East Africa. His promotion to Flight-Commander was only gazetted on the 2nd inst.

Lieutenant JOHN KEITH GRANT ROBERTSON, R.F.C., who was reported killed on January 1st, was the elder son of Mr. John Herbert Robertson, I.C.S. Retired, now serving with the Royal Fusiliers at the Front, and Mrs. Robertson, of Ark Royal, Buckhurst Hill, Essex. Born at Fittleworth, Sussex, in 1895, he was educated at St. Cyprian's, Eastbourne, Harrow School, "La Chatelaine," Geneva, and Edinburgh University, which he left to pursue a business career in the firm of Messrs. Robert Ingham Clark and Co., Westham Abbey, Stratford. On the outbreak of war he enlisted in the R.A.M.C., obtained a commission in the A.S.C. in November, 1914, went to the Front in August, 1915, and was invalided home in March, 1916. He afterwards joined the Royal Flying Corps, obtaining his wings on returning to the Front last November.

Second Lieutenant DOUGLAS JOHN TAYLOR, R.F.C., who has been killed whilst flying in Egypt, was the eldest son of Mr. and Mrs. John Taylor, of Holly Grove, Fittleworth, Sussex. He was 27 years of age. In 1914 he obtained his degree of Bachelor of Science at London University, and was employed at the Imperial Institute, where he displayed considerable ability. At the outbreak of war he decided to enter the Royal Flying Corps. In 1916 he obtained his commission, and was selected for service at Salonica, being afterwards transferred to Egypt. His brother is in the Navy.

Lieutenant WILLIAM MABERLEY FATT, Canadian Contingent (killed in an aeroplane accident), saw nearly a year's service at the Front. The aeroplane accident occurred in England on the 4th inst. Lieutenant Fatt was in his twenty-fifth year, and was eldest son of the Rev. F. H. Fatt, of Victoria, B.C. He came over with the second contingent of the Canadian Expeditionary Force, and had his lieutenant's commission in June, 1915.

Lieutenant FREDERICK HARRY TURNER, M.C., R.F.C., who met his death in an aeroplane accident in Yorkshire on January 10th, was the only son of Mr. and Mrs. Fred Turner, of Priory Road, High Wycombe. Born in 1896, he was educated at Wycombe Royal Grammar School and Queen's College, Taunton, and was a member of the O.T.C. at school, and one of the best shots in the corps. On the outbreak of war he joined the London University O.T.C., and in December, 1914, he was gazetted Second Lieutenant in the 10th Gloucestershire Regiment. He went out to France the following August, and was promoted Lieutenant a month later. Lieutenant Turner took part in several engagements, and was awarded the Military Cross for his gallantry at the battle of Loos.

He transferred to the Royal Flying Corps a few months ago, and obtained his certificate as a pilot. Last week he accompanied Captain Burdon in a flight, and near Leeds the machine fell in flames, both officers being killed.

Married and to be Married.

The marriage between Flight Sub-Lieutenant M. BIRKBECK, R.N., and Miss LETTICE ELLIOT will take place at St. Barnabas, Pimlico, on Saturday, February 3rd, at 2 p.m.

Second Lieutenant HENRY BROOME DURLEY GRAZEBROOK, R.F.C., M.A. (Oxon.), of Gray's Inn and the Middle Temple, and barrister-at-law, elder son of Mr. and Mrs. H. Durley Grazebrook, of Caenwood Grange, Beulah Hill, Upper Norwood, was on the 12th inst at Bournemouth married to ETHEL GERTRUDE, elder daughter of Mr. and Mrs. A. S. WESTMORE, of Bournemouth.

An engagement is announced between HERBERT WILLIAM HARE R.F.C., only son of the late Colonel HERBERT SEYMOUR MARSHALL, Punjab Infantry, and Mrs. MARSHALL, of Revelstoke, British Columbia, and EVELYN MARGARET, fourth daughter of the late Mr. JOHN ORR-EWING and Mrs. ORR-EWING, of Holmer, Weston-super-Mare.

The marriage took place on January 13th, at St. John's Church, Blackheath, of Captain ROWLAND F. S. MORTON, R.F.C., son of the late Rev. C. J. F. Morton, Vicar of Goole, Yorks, and of Mrs. Morton, Blackheath, to JOAN ISABEL, third daughter of Mr. and Mrs. ARTHUR WATKINS, Blackheath.

The wedding of Flight-Lieutenant J. D. NEWBERRY, R.N., second son of Mr. Charles Newberry, of Prinzberg, Clocolan, South Africa, and MARY LETHBRIDGE (MOLLIE), second

daughter of Mr. H. P. COWPER, late of The Brigalows, New South Wales, will shortly take place in Eastbourne.

The marriage arranged between Squadron-Commander DOUGLAS A. OLIVER, D.S.O., R.N., only son of the Rev. Austin Oliver, and SHEILA, daughter of the late Captain FRANCIS GRANT-SUTTIE, R.N., and Mrs. GRANT-SUTTIE, 3, Stafford Mansions, Buckingham Gate, was announced to take place this week.

The marriage is announced to take place at St. Peter's-in-the-East, Oxford, on Saturday, of Second Lieutenant S. M. PEMBERTON, R.F.C., elder son of the late Rev. A. H. Pemberton and Mrs. Pemberton, of Bury St. Edmunds, to EILEEN M. CHAPMAN JOHNSON, widow of J. Chapman Johnson, and youngest daughter of the late Dr. W. Bedell Benison and Mrs. Benison, of King's Heath.

An engagement is announced between Flight-Lieutenant LESLIE GORDON WRIGHT, R.N., second son of Mr. and Mrs. A. A. Wright, of Acton Hill, W., and Miss MAUD MAY KNIGHT, youngest daughter of Mr. and Mrs. W. A. Knight, of Bruton, Somerset.

Items.

Captain LORD LUCAS, of Wrest Park, Ampthill, and of the Hampshire Yeomanry and Royal Flying Corps, Under-Secretary to the War Office in 1908-11, Under-Secretary for the Colonies in 1911, Parliamentary Secretary to the Board of Agriculture, 1911-14, and President of the Board of Agriculture, 1914-15, killed in France on November 3rd, aged 40, left estate of the value of £100,000, so far as can at present be ascertained. Lord Lucas was unmarried, and the Barony now goes to his sister, the Hon. Nan Ino Herbert.



AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

Admiralty, January 11th.

"His Majesty's seaplane carrier 'Ben My Chree' (Wing-Commander C. R. Samson, D.S.O.) was sunk by gunfire in Kastelorizo Harbour (Asia Minor) on Jan. 11th. The only casualties were one officer and four men wounded."

War Office, January 15th.

"Salonica.—A hostile aeroplane was brought down by the Royal Flying Corps near Lahana, the German pilot and observer being taken prisoner; the machine was undamaged. This is the fourth aeroplane brought down in the last three weeks."

French.

Paris, January 11th.

"Salonica.—British hydroplanes have bombarded Gekevitch, south-east of Xanthi, and 12 British aeroplanes have effectively bombed the military establishments of Hudovo and Strumitsa. A French squadron of eight aeroplanes has succeeded in bombarding an important encampment near Veles."

Paris, January 14th.

"An enemy aeroplane was forced to land in our lines near Pont-a-Mousson. The airmen were taken prisoners."

Russian.

Petrograd, January 9th.

"In the evening of Jan. 8th enemy aeroplanes dropped bombs on Lutsk."

Petrograd, January 10th.

"In the region of the village Minitchi (on the Shara, south of the Slutsky high road) one of our aviators hit an enemy aeroplane, which fell into the enemy's lines. During the night of Jan. 9th several squadrons of enemy aeroplanes dropped bombs on Luzk."

Petrograd, January 12th.

"Roumanian Front.—During our reconnoitring operations in the vicinity of the valley of the Putna one of our aeroplanes met two enemy machines, and engaged in battle with one of them, compelling it to descend."

Italian.

Rome, January 9th.

"Enemy aeroplanes yesterday attempted several raids on our territory, but were repulsed by our anti-aircraft batteries and pursued by our chasers. One of our squadrons successfully bombarded military objectives in Reifemberg S. Daniele and Cobdil, in the Valley of the Branizza (a confluent of the

Vippaco). Escaping from the enemy's anti-aircraft fire and driving back all attacks of hostile aeroplanes, our machines returned safely to their bases."

Rome, January 12th.

"During the night of Jan. 11th-12th an enemy air squadron dropped a considerable number of bombs in the neighbourhood of Aguleja. Three men were wounded and some damage done. One of the enemy's seaplanes was brought down by our anti-aircraft batteries. The aviators were taken prisoners. At the same time two of our aeroplanes successfully bombarded the aviation ground at Prosecco and the seaplane base in the harbour of Trieste. Escaping from the heavy fire of enemy anti-aircraft batteries they returned safely."

Rome, January 13th.

"Italian and French hydroplanes yesterday effected an offensive reconnaissance over Pola, dropping bombs on enemy units. Counter-attacks were made by enemy aeroplanes, which were repulsed in an aerial fight. One of our hydroplanes fought three enemy aeroplanes one after another, and drove them off. Bombs were dropped by enemy aeroplanes on our torpedo-boats at sea without effect. All our aerial and naval units returned undamaged to their base."

German.

Berlin, January 11th.

"Our airmen shot down two British captive balloons, which fell to earth in flames."

Austrian.

Vienna, January 12th.

"On the night of Jan. 11th-12th a squadron of naval aeroplanes very successfully shelled the aeroplane ground near Belligna with bombs. The aerodrome there had been rebuilt since its destruction by our airmen during the attacks they made upon it on Nov. 14th and Dec. 16th last year. Several direct hits were made upon the newly-erected hangars."

Bulgarian.

Sofia, January 11th.

"In the Drama region an enemy aeroplane was forced to come to earth. We took the occupants prisoners, who were both Serbians. The machine was completely intact."

Sofia, January 14th.

"Our aeroplanes dropped bombs on the port of Saint George and near an aeroplane station."

Air Work in Roumania.

The Times correspondent at the Headquarters of the Roumanian Army, writing on December 24th, says:—

"During the past week a successful fight in the air was fought by a British airman, Flight-Lieut. Jacob, who on a Nieuport scout brought down (near Braila) a German two-engined battleplane. Two of the crew of the enemy machine

were killed and the third was taken prisoner. By the special wish of the King, Colonel Thomson, British Military Attaché, presented Flight-Lieut. Jacob to-day. The King handed personally to the brave airman the highest Roumanian order, that of Michael the Brave, and congratulated him on his bravery, expressing his joy that an Englishman should be the first foreigner who had received this high Order.

AIR WORK IN EAST AFRICA.

SOME details of the splendid work of the South African Squadron of the Royal Flying Corps in East Africa is furnished by Reuter's correspondent with the East African Forces. He says:—

"From the occupation of Moschi to the enemy's final retreat from Kahe the aeronauts were busy bombing, observing and reconnoitring. On March 24th Major W—, who had been delayed in South Africa by illness, took command. Then the rain came, and the squadron went into quarters at Mbuyuni, and got busy overhauling its machinery in the light of the knowledge of local conditions already gained. On May 9th Lieut. B—, with General H— as an observer, traversed the Pangani River. The month, as a whole, was devoted to hard work—assembling new machines and correcting the errors of the old. On the 22nd the Corps said good-bye to Kahe, and the advance commenced. Next day gallant S—, testing a new Henri-Farman, crashed to earth, and was picked up as much a wreck as his machine. His brother pilots think he fainted in the air: they know of no other way to account for the sudden dip which his machine took. Capt. O'B— was missing at the time, and it was with intense relief that he was greeted on his return on foot. Fever now laid its hand upon the Corps, and quinine was scarce. Still the Flying Corps worked and scattered bombs about Handeni.

"The Intelligence Department put on record the fact that the moral and actual effect of our bomb raids were invaluable in destroying the moral of the enemy. During the month of July the main body lay at Msiha under the galling shell fire of the enemy, and it was with sheer delight that we witnessed the air raids upon his camp at Ruhungu.

"The picture had its reverse side. The air raids inflicted heavy loss upon the enemy's infantry, but as soon as the planes had disappeared the enemy manned his guns and took it out of us.

"It was in July that the pilot T. experienced a forced landing, the crash rendering him unconscious. When he came to, he found in the neighbouring kraal a native who spoke English, and with this man's assistance was able to get to Handeni; but the native paid dearly for his simple act of kindness, for a German patrol visited his kraal afterwards and hanged him, together with three of his companions.

"The work of the Corps at this time was very difficult. There was no opportunity of building an aerodrome close to the fighting line, and the planes had to traverse great

distances to get at the enemy. The country, however, between our front and the existing 'dromes was so thick and heavily wooded that it was impossible to get any nearer. On August 7th the move against Ruhungu commenced, and great and ceaseless vigilance was required from the airmen. From being too far behind the squadron got too far in front, and found itself in difficulties with its transport unprotected, and the fighting then a quarter of a mile away. Orders were consequently given for retirement to Turiana. In August Morogora was visited for the first time by the 'birds,' and here the pilots received a warm reception. A naval gun mounted on a railway turntable made an excellent anti-aircraft weapon, but in the face of a storm of shrapnel fired from that and other guns, and some erratic attempts with rockets, the railway station and the enemy's military lines were successfully bombed.

"On August 11th one of the most successful of the bombing raids took place, five aeroplanes attacking the town and fortified camp of Ngulu Kwa Boga. Subsequent reports show that the enemy suffered heavily. Altogether the day should be written down most successful, and it added to the dread which the enemy already had of 'the birds that drop the eggs of death.'

"The squadron was next located at Morogoro, and the penultimate phase of the campaign had been brought to a conclusion. Its aircraft park was 350 miles behind it, and its advanced aircraft park 200 miles. Some concentration, therefore, appeared to be necessary, and that is now going on.

"The Flying Corps in East Africa has been of the greatest use from a military point of view. Indeed, without it the campaign must have been very greatly prolonged. While upon this subject it may not be inappropriate to point out how desirable it is that a unit of the Flying Corps should be permanently located in South Africa. We have a good start. It would be a pity to lose the peculiarly South African character of this unit, and we can only maintain that character by making South Africa its domicile and its recruiting ground."

In a message from Duthumi, dated January 4th, and detailing the fighting in German East Africa on New Year's Day, Reuter's correspondent makes the following reference to air work: "During the day aeroplanes patrolled the whole line, dropping bombs and spotting for the artillery, while the communications were well maintained by telephone, telegraph and wireless."

Roumanian Honour for R.N.A.S. Pilot.

It is announced that the King of Roumania has conferred the Order of Michael the Brave on Flight-Lieut. A. F. Jacob, R.N.A.S., who while flying a Nieuport scout recently brought down near Braila a German twin-engine machine. It is understood Flight-Lieut. Jacob is the first foreigner to receive this high distinction.

Fatal Accidents.

AN inquest was held on January 6th relative to the death of Lieut. W. M. Fatt, Canadian, attached R.F.C., who was killed in an aeroplane accident on January 4th. The evidence showed that the machine was flying at a great height and it descended slowly. When within 100 ft. of the ground it dashed down and caught fire. It was thought that the pilot was in difficulties when trying to alight in a strong wind. A verdict was returned that "Death was due to Burns," but that there was no definite evidence to show what caused the machine to fall.

In a North Country district, also on January 6th, an inquest was held respecting the death of Second Lieut. J. W. Mowat, R.F.C., whose machine fell during flying practice. The evidence showed that on January 5th he went up for a first solo trip on a particular type of machine. He ascended all right and was flying about when the machine was noticed to list and fall. A verdict of "Accidental Death" was returned.

While descending near Leeds on the morning of January 10th an aeroplane caught a tree top, and, coming to earth, burst into flames. The pilot, Capt. R. Burdon, and the passenger, Lieut. F. H. Turner, were both killed.

News was received at Southampton on January 10th of the death while flying of Flight-Commander Edwin Rowland Moon, R.N.A.S.

Caught in a snowstorm while flying near a Yorkshire aerodrome on January 13th, 2nd Lieut. T. H. French, R.F.C., had to make a forced landing. The machine touching some trees crashed to the ground and burst into flames. The pilot

was killed instantly. At the inquest on Jan. 17th, a verdict of "Death from Misadventure" was returned.

Three Prominent French Pilots Killed.

IN the death of Henri Bregi, as the result of a seaplane accident at Toulon, French aviation has lost one of its pioneers, as he secured his pilot's brevet (No. 26) on December 21st, 1909, on a Voisin biplane. Later he flew a great deal on a Breguet biplane, one of his most noteworthy flights being made in the summer of 1911, from Casablanca to Fez, a distance of 300 kiloms.

The pilot Sauvage, whose death is announced, had shot down seven enemy machines. He started for a flight over the German lines on January 7th, and was clearly seen by another French aviator to be struck by a splinter from a shell. He saw him plane down, but was not able to ascertain whether he succeeded in restarting his machine after reaching the ground.

The death is also announced of the aviator Bedora, who was injured when returning from a raid against Zeppelins.

Echoes of Zeppelin Raid.

TWO decomposed and charred bodies, presumably those of members of the crew of the Zeppelin burnt off the Durham Coast on November 28th, were washed ashore on the North-East Coast on January 9th. They were buried with military honours two days later. On January 14th a third body was washed ashore at Cleveland. Apparently the recent severe weather has liberated the bodies from the wreckage.

The Latest Zeppelins.

ACCORDING to a story current in Paris, the Zeppelin factories at Friedrichshafen have just turned out the "L40." It is stated that the screws now work almost noiselessly, and the airship is fitted with an arrangement which allows it to be enveloped in gas, rendering it invisible. Probably this is one of the 170 odd which are presently to be sent over *en masse* to strafe us.

SIDE-WINDS.

MR. W. BARNARD FARADAY, LL.B., Barrister-at-Law, has been appointed Secretary of the Aeronautical Society. Mr. Faraday is a near relative of the famous Prof. Faraday, F.R.S., who was connected for so long with the Royal Institution.

At the Town Hall, Reading, on January 10th, a very bright and cheery function was the dance given by the Sergeants' Mess of the School of Military Aeronautics. Among those present were the Commandant (Lieut.-Col. Bonham-Carter) and officers of the School, and members of the messes of neighbouring units. Under the direction of Sergt. A. V. Smith (secretary) and Sergt. L. F. Fagg, the hall had been tastefully decorated; while, thanks to the M.Cs., Sergt.-Major Henderson and Flight-Sergt. E. Robinson, the programme was carried through with a snap that made for complete enjoyment. The dancing was ably led by an excellent band under Air-Mech. Howarth.

PROBABLY one of the greatest "luxuries" to a wounded soldier is a really new laid egg. To supply these means but little effort on the part of the individual, but to the Committee for National Egg Collection the work of organisation is a prodigious business. Up to the present their unflagging efforts have resulted in millions of eggs being available for the enjoyment of our wounded and sick soldiers, and, by way of a little extra effort, the Committee have decided to make a big street collection on Wednesday, February 14th, for so increasing the cash side of the Fund, that they may, with luck, be able to procure and distribute still more millions of these much-prized delicacies—or are they necessities? One of the greatest helps to this end would be the loan to the Committee, for the day, of a few motor cars, to enable the organisation to be the more successfully carried through. Who will put forth a helping hand for so good a cause? The ever-present crux of motoring—the supply of petrol—can be left to settle itself, so long as a few cars are available. This body of enthusiasts, who work quietly but very persistently, are officially recognised, and have as Patron Her Majesty Queen Alexandra. We would ask any owner who can give a helping hand to this unique organisation to either communicate with the Editor at 44, St. Martin's Lane, or direct to the organiser of the National Egg Collection for the Wounded at 154, Fleet Street, E.C.

As the aviation industry has drawn very largely upon the motor trade for recruits, the good work done by the Cycle and Motor Trades Benevolent Fund is not unknown among aircraft workers, and many will be interested to hear that the benefits of the Fund are now open to them. After further consideration of the question of the eligibility of employees of firms engaged in the aircraft industry, the Executive Committee has decided in favour of their inclusion. It is held that the definition in the rules "factories for the manufacture of cycles or motors" includes factories for the manufacture of aircraft.

ANOTHER emphatic testimonial to the efficiency of Triplex safety goggles and windscreens has just been received by the Triplex Safety Glass Co., of 1, Albemarle Street, W., from a flying officer who unfortunately crashed while testing a fast experimental machine. One glass of the goggles was cracked, but the fact that they were Triplex saved the officer's eyes from being cut or injured, while the Triplex windscreen on the machine came through unscathed, although the immediate surroundings were battered. *Verb. sap.*

ANOTHER newcomer to the aircraft industry, this time across the Tweed. The Osborne Aircraft Components Co., of Whinhill, Greenock, Scotland, of which Mr. W. M. Osborne is managing-director, are open to supply all aeroplane fittings and components. It is also intended to take contracts for main and tail planes, ribs, fins and elevators.

THE Dunlop Rubber Co., Ltd., has applied for a quarter of a million of the new Loan.

PUBLICATIONS RECEIVED.

Almanack, 1917. Joseph Owen and Sons, Ltd., Borough Saw Mills, 199A, Borough High Street, S.E.

Catalogue.

Fuller Accumulators. The Fuller Accumulator Co., Ltd., Woodland Works, Grove Road, Chadwell Heath (Essex).

Pay of R.F.C. Storekeepers.

AN Army Order, issued on January 9th, announces that the pay of warrant officers, non-commissioned officers and men of the Royal Flying Corps employed in the Storekeeping Section of that Corps is to be the same as for soldiers of the Royal Flying Corps employed as clerks, as laid down in the Warrant of December 20th, 1916, with the exception of 3rd Class Air-Mechanics, who shall be paid the 1s. rate instead of 1s. 8d. as laid down therein.

These rates will not apply to soldiers now serving as Storekeepers, who will continue to draw their present rates until promoted, when they will receive the new rates under the same conditions as those applicable to the clerks of the Royal Flying Corps.

LEGAL INTELLIGENCE.

R.A.F. Secrets.

AFTER a long hearing *in camera*, on January 16th, at Aldershot, Peter Maw Brown, a foreman at the Royal Aircraft Factory, was fined £50 for communicating information about certain aircraft likely to be of use to the enemy.

Herbert Allan Mothersill was fined £50, and Severo Campo Fregoso, an Italian, £25 for collecting and recording it. Fregoso was said to have invented a high-powered aero engine.

The Chairman of the Bench said the characters of the men were above reproach, and Fregoso's credentials and antecedents were unimpeachable, but technical offences had been committed.

COMPANY MATTERS.

Fellows Magneto Co.

THE subscription list of Fellows Magneto Co. has now been closed, preferred shares to the value of over £46,000 out of the 50,000 8 per cent. cumulative preferred and participating shares offered having been subscribed for and allotted by the directors.

Simms Motor Units, Ltd.

FOR the financial year ending June 30th, 1916, a dividend of 25 per cent. has been declared on the paid-up capital of the company. An amount of £20,680 1s. 2d. has been carried forward, after making ample provision for depreciation, and the transfer of £4,000 to reserve account.

NEW COMPANIES REGISTERED.

AIRCRAFT COMPONENTS AND ACCESSORIES, LTD., 33, Fleet Street, Birmingham.—Capital £100, in £1 shares. First directors: A. Spragg and T. Butler.

BRITISH TRANS-OCEANIC CO., LTD.—This company was registered with a capital of £20,000 in £1 shares, to carry on the business of manufacturers of and dealers in aeroplanes, seaplanes, airships and the component parts thereof, to acquire, provide and maintain hangars, garages, sheds and aerodromes, &c. First director, W. E. Wood.

Aeronautical Patents Published.

Applied for in 1915.

Published January 18th, 1917.

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